Dmitri Guryev
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INTRODUCTION

Every normal person understands that he possesses consciousness, that it guides his actions. The great French philosopher René Descartes expressed this ordinary conviction of ours in an explicit philosophical form: "Cogito, ergo sum," that is, "I think, therefore I exist," therefore I understand the goals and results of my behaviour, my place among people.

But what is *consciousness*? How does it differ from man's other characteristics? In what way does it resemble the psyche of animals and in what way does it differ from it? How is it associated with man's body, especially the activity of his brain? These and other questions have long taxed people's minds. The results of numerous studies by ethnographers have clearly shown that even savages attempted to grasp the essence of their psyche and not without success. For them the graphic essence of the psyche was obvious, for they readily distinguished the images of objects and actions with them — i. e., knowledge, experience, behavioural habits — from objects and actions themselves. The former were readily summoned in their consciousness in the lack of the latter, were transformed into fantastic notions

about reality. With their aid primitive men were able at will to transport themselves into the past and future. They grasped the actual existence of images of reality, their active role in man's behaviour and quite often considered mental activity during sleep (dreams) and hallucinations more real than the phenomena of reality itself.

The savages were convinced that consciousness actually exists by itself, outside man, and is capable of being embodied in other phenomena. Hence the entire environment is inhabited by diverse good and evil spirits, which actively influence their entire behaviour. Rocks, trees, hills, etc., to say nothing about animals, possess a soul and can either help or hamper hunting and other types of primitive men's activities.

Thus savages, while possessing correct notions about some aspects of their consciousness (of the correspondence of the content of images with the characteristics of the phenomena of reality, which ensured the success of their behaviour, of the qualitative distinction of images from their material prototypes, of the big role played by the images of objects and actions with them in the life of men, etc.), failed to understand the essence of consciousness, which predetermined their incorrect, mystical notion about their psyche as a soul existing by itself, outside man, in the form of various spirits, gods, etc., which were imbued with a greater reality of existence than the life of men and which shaped their psyche.

With the appearance of class society, and together with it theological teachings of an idealistic nature, primitive mystical notions of consciousness acquired a science-like form. If savages

never posed the question of its origin, theologists in their works substantiated the assumption that consciousness, soul, speech were given to the first men by God himself at the moment of their creation. True, such works provide no answers to the questions when, where and how this took place, especially since different religions provide quite different answers to them, which are not corroborated by any facts. In principle, the theologists' notions of the essence of consciousness boiled down to the following: consciousness is mystical by its nature and origin, exists outside the human body in the form of a divine spirit, which shapes man's entire behaviour.

In their attempt to adapt these old religious notions of human consciousness to the latest scientific data, present-day theologists tend to modify them slightly. Thus, they grant the possibility of a natural origin of the human body, yet continue to assert that the main thing in man — his soul — comes entirely from God. Some even agree that a normal organism is essential for the activity of consciousness but only as an external condition that has no bearing on the essence of consciousness. The ideologues of religion capitalise in every possible way on the distinctions between consciousness and the body, asserting that since during operations on the human brain no consciousness has been discovered, it possesses a supernatural, divine nature.

Contrary to the religious-idealistic interpretation of the essence of consciousness, which precludes the possibility of a correct approach to the solution of these questions, science has sought from the outset to reveal the natural character of the genesis of consciousness. As of this writing

it has comprehensively proved that consciousness, first, represents the reproduction of characteristics and associations of phenomena of reality, the reflection of the latter above all in man's brain, in the acts of his behaviour. In other words, the content of human consciousness is not given man by God or some other mystic force. It is shaped by the external environment and appears in the process of interaction with it. Even man's most outlandish, illusory notions about witches, mermaids, sphinxes, etc., are in their content borrowed from the phenomena, things around them, merely transformed by the unbridled fantasy of the creators of these notions. Second, science has to a great extent revealed the mechanism of the link between consciousness and the activity of man's organism, his brain, organs of sense, organs of speech, hands, etc., on which we will repeatedly concentrate the reader's attention. Third, it has been scientifically proved that there exists a link between consciousness and man's social behaviour. All these questions will be examined in this book.

As we all know, one cannot understand the essence of a phenomenon without revealing the causes and conditions of its appearance. Even in the Antiquity, philosophers attempted to ascertain the origin of consciousness. However, the extreme paucity of knowledge at the time about humanity's past made it impossible for them and many other generations of philosophers and scientists to solve this extremely complex problem. And only in the middle of the 19th century through the efforts of the English naturalist Charles Darwin, his followers — the English biologist Thomas Huxley, the German biologist

Ernst Haeckel and a number of other scholars did this branch of science make appreciable headway. It was indubitably proved that not only the body but also the psyche of man had originated naturally as a result of the evolution of the ancient gorilla and chimpanzee type apes once inhabiting the torrid zone of Africa; that human consciousness resembles to a great extent the psyche of anthropoids, particularly with respect to expressing emotions and feelings, the content of sensations, perceptions and notions. Dealt thereby was a blow at the religious notions regarding the origin of consciousness. Small wonder then that the ideologists of the church immediately announced a relentless war against Darwinism as a whole, attacking primarily its materialistic explanation of the genesis of consciousness.

In the struggle against the materialistic interpretation of the origin of consciousness, representatives of diverse religious-idealistic trends have, naturally, concentrated on the imperfections and gaps in the solution of the problem proposed by Darwin and his followers, who failed to see the qualitative difference between the consciousness of human beings and animals — its *social* nature, and consequently, also the social causes of its appearance.

This considerable shortcoming in the understanding of the essence and genesis of consciousness was surmounted by the great 19th century materialist thinkers Karl Marx and Frederick Engels. They, for the first time, proved that human consciousness represents a social phenomenon by its content, by its form, and by the mode of its existence in man's social activity, that its

origin is influenced by the genesis of social labour and speech, and that it appears together with them. It is on the teaching of the founders of Marxism on the nature of consciousness and its origin that we shall base ourselves in analysing new data of present-day science. To help the reader understand the content of a book devoted to such a complex problem, it is advisable to summarise its logical construction.

Set forth in Chapter One of the book are data of present-day science on the nature of human society and consciousness, and a definition of the basic notions: human thought, sensory and conceptual images of reality, will, feelings, etc.

In Chapter Two we compare human consciousness with the psyche of the highest apes as beings most closely related to man. First, the clarification of their similarity and distinction is important for substantiating the very possibility of the origin of consciousness in a natural way. On the basis of interesting material of the latest studies on the behaviour of gorillas and chimpanzees in natural and experimental conditions we show that the highest apes possess great possibilities for the complexification of their behaviour, and hence also their psyche. Second, acquaintance with this material is important for us also because the chimpanzee, the gorilla, and man appeared several million years ago from common ancestors; moreover, the first two have undergone practically no change since then. Consequently, scientific data on their psyche are a kind of key to revealing the character of the psyche of man's distant ape ancestors, attest to the possibility of their entering, given favourable external conditions, the road of humanisation.

Examined in Chapter Three are numerous scientific data on the behaviour of the descendants of gorillas and chimpanzees, which were called australopithecines ("southern apes"). In it will be given a detailed explanation when precisely the australopithecines, in the opinion of most scholars, were capable of turning into the first human beings, and their psyche — into the beginnings of consciousness.

Finally, in Chapter Four the reader will be acquainted with scientific data on the origin of society, consciousness and language.

The book's main idea consists in the fact that consciousness appears not merely as a result of the development of the australopithecine's psyche as such, but as a significant stage in the transformation of a herd of australopithecines into the first, as yet undeveloped human communities and, later on, into genuine human communities. It is this complex process and above all the origin of labour, i. e., the activity of making and handling stone and other tools that served as the chief cause of the transformation of the as yet animal psyche of the australopithecines into embryonic consciousness and its gradual development to its present condition.

Such will be our path to solving the secret of the origin of consciousness and, hence, to the explanation of its essence. Simultaneously we shall attempt to answer in general outline some long-debated questions, on which directly opposite views have been expressed (in science they are called antinomies). The first antinomy may be formulated as follows: is consciousness a characteristic of the brain or of man? Second, is consciousness individual or social? And third, the

most important thing for us is to establish whether consciousness originates directly or through mediation from the psyche of animals?

The importance of a correct understanding of the origin and essence of consciousness and its role in the life of society is obvious, especially now, when all people on earth are faced with a most important and urgent task — to realise the imperative need of acting together in defence of peace, not to permit the launching of a new world war, to unite the efforts and resources of peoples for the solution of global ecological, demographic and other problems.

Understandably, such a complex and multifaceted problem cannot be comprehensively examined in a small book. The author sets himself a more modest task: in the light of the data of present-day science and Marxist ideas on the genesis of consciousness to reveal to the reader the crucial point of the problem, and to induce him to delve further into it.

CHAPTER ONE

WHAT IS CONSCIOUSNESS?

As we all know, man can possess consciousness only in a society of similar beings. This is borne out by the age-old experience of child upbringing, which essentially consists in accustoming them to living in society through their mastery of labour and speech, and through the latter, of the accumulated knowledge of previous generations, the culture of behaviour. The correctness of this contention is confirmed by numerous examples of people growing wild when landing on an uninhabited island, cases of prisoners held for prolonged periods in solitary confinement, going out of their minds, etc. Hence, men's consciousness is the consequence of their life in society. Therefore the secret of its origin should also be sought in the genesis of society. But what is society? How does it differ from communities of ants or bees, from herds of diverse animals, including apes? The question of the nature of society is an extremely complex one. Hence we shall deal with it only in a very general way and only in so far as it has a bearing on consciousness.

§ 1. Society As the Basis of Consciousness

In accordance with contemporary notions society is a complex system, which, like any other system, has its own composition, structure, functions and characteristics. But it is an especially complex and, by virtue of its composition, the most developed of all systems.

Indeed, society consists of the most highly developed beings — people, who possess the most perfect brain. The latter is comprised of extremely complex and diversified parts, primary among which is the cortex with its 15 thousand million nerve cells (neurons). Not a single species of animals, including the higher apes and dolphins, have such a developed brain. Science has proved that man's psychic activity is implemented directly thanks to it. And an especially big role in the process is played by the anterior part of the cerebrum and the speech centres, which are characteristic only for the brain of man. In addition to the above-mentioned features, the human brain possesses the peculiarity of a clear-cut differentiation into a right and left side, the latter ensuring the possibility of notional thinking.

Apart from the most perfect brain man also has the best articulated hand that is capable of performing complex and diverse actions, developed organs of sense and organs of speech, which specialise on pronouncing articulate sounds and joining them into the most varied combinations. In short, according to the perfection of his bodily structure man is unique compared to all the other animals.

Human society is unique also in another sense.

Only people have such a multitude and variety of objects created by them — machines, instruments, works of art, household articles, etc. True, some species of animals also have objects created by them for the satisfaction of their needs. Among the latter are beehives, anthills, beavers' lodges and dams, etc. But all that has been created by people differs from the objects made by representatives of the animal world in purpose and function, and in rate of development.

With people the objects they have created are separated from them and exist in accordance with their own laws (subsequently this will be shown on the example of the appearance and progress of primitive technology), forming a so-called "second nature" or "artificial environment" made by men, that lies between them and nature. Whereas with all animals, especially in the case of insects, the objects created as a result of their activity constitute a simple continuation of their bodily organs (lengthening or strengthening their work organs), serve directly the satisfaction of their biological needs, including the raising of offspring. Such, for instance, is the nature of the dams, canals and lodges of beavers. Canals serve the beavers as a continuation of their work organs in floating the trees felled in bodies of water, lodges — for ensuring the normal life of adults and young, dams — for the maintenance of a normal level of water, which is also, in a certain sense, a continuation of their work organs and ensures a normal life for these animals.

The next distinctive feature of objects created by people is their relatively speedy, accelerat-

ing rate of development, which, in turn, predetermines a rapid change of their entire social life. Whereas in the case of animals, the means of existence created by them remain practically unchanged until the species disappears.

A no less important feature of the "artificial environment" was its *social* character, which was determined by the successive development of this environment. Each new generation of people finds a world of objects created by their predecessors, which unlike the world of objects created by animals, is continuously being improved. In other words, this world develops by the combined effort of many generations of people. Correspondingly, the world of objects created by people belongs not to individuals, but to whole generations and groups of people comprising them — classes, professional associations, etc., and is used by them in common, in accordance with the laws of functioning and development of the artificial objects themselves. For example, a car is made at a whole series of enterprises, essentially linked with each other. The functions of machine tools and automatic equipment, with the aid of which individual assemblies and parts for it are produced, are clearly social in character, like the car assembled from them.

Whereas in the case of animals, as studies show, the creation and use of objects is primarily individual in character. That is how bees act in their hives, beavers in building their dams, etc. The objects created by them are the result of a mechanical combination of the efforts of species or narrow groups, which permanently or temporarily specialise in strictly defined actions

in accordance with the specifics of their bodily structure.

An important characteristic of the world of objects created and developed in common by people is the accumulation in it of social knowledge and skills, the experience of its creation and use. This knowledge exists for each new generation as something independent of the will and consciousness of its representatives, i. e., objectively. Such is the social information comprised in machines and books, films and photographs, formulas and works of art, etc.

This is not the case with animals, who merely pass on from generation to generation the extremely limited content of behavioural experience, as we shall see later on. The behavioural experience that has been accumulated by each individual changes but little and is only of a personal order: it is not inherited, but merely copied by others, offspring included, in individual communication. One beaver, for instance, may be better at felling and processing trees, but this skill dies together with him.

So, the composition of society differs fundamentally from that of all animal communities both in complexity and variety (both its living and inanimate, tangible parts), and by the rate of development, and by their social nature. We should also stress the extremely close interdependence of both component parts of society. Only in the process of people's use of technology and other objects created by them are they social, human. A machine that is not used is purely a natural piece of metal. And contrarily, each new generation of people remains such only in the process of using the tangible human

world. Take away all books, works of art, machinery — and humanity stops being itself.

More, the inseparable effective link between people and the material world created by them predetermines the fundamental difference in their relation to nature and to each other.

Indeed, the existence of an artificial environment between people and nature transforms this relation into a *social* one. For both its common use by diverse, interconnected groups of people, and common use of the social information contained in artificial objects presupposes people's *conscious* attitude towards nature. An artificial environment, mediating the relation of people to nature, renders it independent of their will and consciousness, i. e., *objective*, material. Finally, the continuous changing of the artificial environment predetermines the constantly changing, *dynamic* character of man's relationship with nature, which also distinguishes it from the relation of all animals to their environment.

The appearance and development of the artificial environment predetermined also the *social* character of people's relation to each other, especially in their common production of the means of existence, i. e., relations of production. They also are social, objective, dynamic and rational. Very characteristic in this respect are property relations, which arise together with the appearance of the means of production and concern both these means themselves and also the necessary products created in the production process, which will be demonstrated later on. Some groups of people, classes possess both the means of pro-

duction and the fruits of production, while others are denied both. In primitive society the land, housing, boats, etc., were owned by a tribal community, and, consequently, by each of its members. All other communities and their members did not own this territory or its wealth. With the appearance of a class society all natural wealth, means and fruits of production became the property of the slave-owning and feudal classes, and at present in the capitalist countries they are owned above all by the monopolies, which brutally exploit the people of their own country and the peoples of other countries.

Animals have no property relations, nor can they have any. The beavers' lodges, as we saw, are a condition of their existence and hence, unlike the means of production, cannot be separated from them, become an object of exchange or distribution. The means of production appear and are created for the satisfaction of peoples' needs in food, clothing, housing, etc. Therefore there exists in society a system of mutually complementary, closely associated branches of production — agriculture, transport, industry. Quite obviously, people should continually be distributed according to these socially essential types of activity, distribute the produced commodity, exchange it. And, consequently, people must to a certain extent be aware of the need of all this, i. e., the need to work for others, handle with care the instruments of labour and manufactured product, share the fruits of their labour, etc.

So, the appearance and development of a social system and above all common production by people of necessary commodities, including for

the satisfaction of their social needs, essentially presupposes the existence of a conscious psyche in people, and constitutes the immediate basis of its existence and development. Each act of a person's behaviour, especially in the case of labour, invariably includes an awareness, to a certain extent, of the social requirements of the given type of activity. The essence of man's labour activity and its distinction from the activity of animals was aptly put by Karl Marx in *Capital*: "A spider conducts operations that resemble those of a weaver, and a bee puts to shame many an architect in the construction of her cells. But what distinguishes the worst architect from the best of bees is that the architect raises his structure in imagination before erecting it in reality. At the end of every labour-process, we get a result that already existed in the imagination of the labourer at its commencement. He not only effects a change of form in the material on which he works, but he also realises a purpose of his own that gives the law to his modus operandi..."[1]

Such a complex system of people's social relations, which are not directly associated with the satisfaction of their biological needs, essentially presupposes the existence of non-biological, purely human means of communication and first of all natural articulate speech. We shall dwell on its origin and essence later on.

Therefore, since human consciousness appears and exists on the basis of man's social activity,

[1] Karl Marx, *Capital*, Vol. I, Progress Publishers, Moscow, 1984, p. 174.

associations and needs, as well as language means of communication, its appearance should also be seen as a direct result of these major aspects of the life of society. This is the key we shall use in revealing the genesis of consciousness. But first it is necessary to explain what consciousness represents and what methods we should be guided by in solving the problem.

In his time the English philosopher Francis Bacon correctly noted that the method of research resembles a traveller's lantern, with the aid of which even a lame person can overtake a fast runner.

Any new phenomenon, appearing from the old, maintains a part of the initial characteristics of that phenomenon. Consequently, these two phenomena form a more complex phenomenon, including them in itself as the higher and lower stages of its development. For example, the modern Arabic languages and those of the Middle Ages, for all their differences as the more or less developed, still form a single Arabic language, making it possible to understand old manuscripts.

All this fully applies also to human consciousness. It also has common features with the psyche of animals, especially the higher animals, which are expressed by the notion "psyche in general". Consequently, consciousness represents a unity of features common with the psyche of animals and, strictly speaking, features of man's consciousness that express its essence, distinguishing it from the psyche of animals. We see that the essence of consciousness is also inseparably linked with the general properties of the psyche as its basis.

This somewhat simplified outline of development of the phenomena of reality enables us to draw up a method for studying the genesis and essence of consciousness, which consists in the following. First, in ascertaining the common features of the consciousness and psyche of animals, especially that of the higher animals, by elucidating the nature of the latter. Second, in ascertaining the specific features of consciousness and its essence, which is our key task. Third, in the simultaneous examination of both types of its properties, i. e., its analysis as a whole.

§ 2. The Nature of Consciousness

A. The Behaviour and Psyche of Higher Animals

Science has ascertained to a great extent the main stages of the origin and development of life on earth, as well as the essence of the behaviour and psyche of animals.

What does the behaviour of an animal represent from the point of view of science? The behaviour of an animal, and man is customarily seen as purposeful adaptive activity that is designed to satisfy the needs required for their existence and propagation. The prominent Soviet physiologist P. K. Anokhin showed that the behaviour of all animals, beginning with the simplest ones, is characterised by anticipation of cyclical phenomena — change of day and night, seasons, climatic phenomena, etc., and also the organisms' initial assessment of external events from the viewpoint of their usefulness or harmfulness for themselves.

These general behavioural traits of animals and their reflection of reality are also inherent in human behaviour, which clearly bears out the deep-going kinship of the latter with the organic world as a whole and the possibility of originating in it.

The behaviour of lower animals, including the simplest ones, is instinctive, i. e., it is clearly determined by a genetic programme, and hence specific for each species, inherited, stereotyped. Insects, fish, etc., can serve as an example of this. True, they may in the course of life acquire individual behavioural experience, which, however, far from abolishing, merely modifies the instinctive nature of their behaviour.

On the other hand, higher animals, especially anthropoids, while preserving instinct as the basis of their behaviour, have acquired the ability to accumulate and make use of the experience of their lifetime, which is determined primarily by a significant development of the brain and sense organs. As a result, the behaviour of higher animals, while remaining essentially one designed to satisfy fundamental needs common to individuals of the given species, acquires in the process of their life an individual, variable, non-inheritable character.

The great Soviet physiologist I. P. Pavlov proved that this type of behaviour is comprised of an uninterrupted chain of conditioned-reflex acts of animals. The gist of the latter, according to Pavlov, consists in that an individual strives to catch temporal associations existing between biologically neutral and vitally important phenomena of the environment so as to be prepared for the onset of the latter. In Pav-

lov's laboratories experiments were conducted on producing conditioned reflexes in a dog, which in response to the ringing of a bell or flash of a lamp, provided it had received food after them, would run to the feed pan, showing a copious secretion of saliva. Similarly a tiger or a lion, basing itself on previous behavioural experience, establishes a link between a given place and the fair possibility of finding game there and begins searching for it precisely in the regions of its possible habitat. If the object of the hunt changes its habitat, the beast of prey evolves a new conditioned-reflex behavioural pattern, etc.

The experiments of Pavlov and his followers in the Soviet Union and other countries have shown that readily modifiable conditioned-reflex behavioural patterns evolved in an animal's individual life necessarily include a psychic part, consisting of its notions of the objects of action, means and ways of future actions, corresponding emotions, etc. According to P. K. Anokhin's theory of functional systems, an animal (and man) realises his life cycle as an uninterrupted chain of elementary, i. e., the simplest, further irresolvable acts of behaviour. Each of them is designed to satisfy the need of the animal at a given moment and represents a system of interrelated acting mechanisms of the organism — primarily of the brain, and also of the working organs, organs of sense, etc. Satisfaction of a definite need, for instance in food, signifies the end of corresponding acts of behaviour (or a series of them) and the beginning of a new series in accordance with the appearance of the organism's new needs. In

general outline, such is the process of a live organism's vital activity.

Without going into the details of this complex theory, we note the ensuing conclusions to the effect that the psyche is "intertwined" in acts of behaviour as an essential part of them and that it is composed of two parts — internal (cerebral) and external (manifested in the actions of working organs).

For clarity's sake let us examine the given theory as applied to a beast of prey's acts of behaviour. Induced by the need for meat it surveys, "studies" the situation, sniffs, listens and compares the received information with the results of past behavioural experience. Using the language of Anokhin's theory of functional systems, we can say that the animal accomplishes with the aid of the brain mechanism an "afferent synthesis"[1] of past and present information. On the basis of this complex psychic process the animal more or less confidently accomplishes the following psychic act — adopts a decision (for instance, to follow or not to follow the prey, to pursue it alone or together with other individuals, etc). Understandably, an animal that is incapable of making a quick and correct decision would find itself in the position of an ass (described by the French philosopher Jean Buridan) which died because of its inability to choose between two equal and equidistant bundles of hay. In short, the animal would be unable

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[1] From the Latin *afferens* — directed towards a central organ or section, as nerves that conduct impulses from the periphery of the body inward to the spinal cord.— *Ed.*

to survive in a continuously changing environment.

The next stage of the brain's psychic activity as an aspect of the functional system (act of behaviour) is the elaboration of the "acceptor of the results of an action"[1], i. e., the formation of a chain of concrete goals of future actions of working organs (running, creeping up, jumping, etc.) and the mechanism of assessing their efficacy. The sum total of the working organs' actions includes the process of realising goals — the final stage of the subject's psychic activity when carrying out an act of behaviour or a chain of them.

Animals, especially higher animals, do not as a rule live alone. That is why in their communities they constantly communicate with one another with the aim of procuring food, neutralising external threats, raising and protecting offspring, etc. Consequently, apart from implemental behavioural acts animals also perform acts of contact, communication. Their structure is on the whole similar to that of the implemental acts of behaviour examined above. The specifics of communicative acts consists in, first, the special object of influence, which is an individual of the given community, with its activity, psyche. Second, in the motives of behaviour of each individual, predetermined by a change in the condition or behaviour of co-members of the group in achieving individual or common goals. Third, in one's own means of action in the shape of

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[1] The Latin term *acceptor* signifies appraising, evaluating something or other.

sounds, gestures, poses. As a result of this acts of communication also have their own psychic aspect with its emotions, concrete goals, etc. (which will be dealt with below).

Obviously, both types of animal acts of behaviour are internally associated with each other. An implemental act, as a rule, presupposes corresponding acts of communication. As we shall see later on, in an anthropoid herd not a single action of an ape regarding the environment escapes the notice of other individuals, and cannot help influencing them. And contrarily, acts of communication of group members are subordinated to implemental acts, ensuring their efficacy and, consequently, the success of the animals' joint adaptation to a continuously changing environment.

But in what form does the psyche of animals exist, i. e., the generalisation of information, adoption of decisions, working out of goals, etc.? Science provides an answer to this question as well: all forms of psyche represent sensory images, primarily notions about external phenomena and actions with them, which exist *ideally* for the subject in the sense of an absence in them of corporeal properties of the reflected objects, phenomena, products of the activity of the brain and working organs. Inasmuch as for the subject an image exists by itself, in isolation from its external prototypes, that image is ideal for the subject in the sense of a possibility of manipulating it, joining it with other images, transforming them into goals, etc. In short, an animal's psychic activity, its thinking by images of objects and actions with them are also ideal.

The ideal character of images and thinking with

them is highly advantageous to an animal in its vital activity. First, in the sense of an animal's speedy recognition of the numerous environmental phenomena by comparing them with the image that was formed in the process of interaction with the environment in the past. If an animal comes across a new phenomenon, it naturally shows caution, studies it or moves away from it. If the phenomenon is known to the animal, its image is used by it to draw up a plan of further behaviour. Second, the facility of transforming images of objects and actions with them enables an animal quickly to adapt itself to the continuously changing environment by a corresponding change in its decisions, goals, behavioural programmes. Third, the above-mentioned quality of images makes it possible for an animal to foresee to a certain extent the course of events in the environment and hence, adapt itself to it beforehand. For example, an experienced wolf, knowing a rabbit's habits, intercepts, ambushes it, etc.

An animal's psyche with its figurative memory, attention, figurative thinking is characterised by yet another important feature — *emotions*, with the aid of which an animal, first, *evaluates* environmental phenomena in the sense of their usefulness or harmfulness for itself, and also assesses its own condition — satisfaction or non-satisfaction of its own needs. Second, they *induce* the animal to act. A sated animal is inclined to be inactive, whereas a hungry animal is highly active owing to an unsatisfied need, i. e., feeling of hunger.

As a whole the psyche of higher animals is very complicated in structure. It cannot exist outside their behaviour and is essential to them

for adaptation to a changing environment. The latter is largely shaped by the ideal image nature of their psyche, which enables them to quickly adopt and change decisions and goals of future actions, controlling the results of their intermediate and final stages. As an aspect of an animal's behavioural act, the psyche consists of memory, attention, emotion, thinking, which in the aggregate ensure the reflection of reality and regulation of behaviour. It is important to note the splitting of an animal's psyche into the internal (cerebral) and the external part. The first determines the character of the working organs actions with objects for the immediate realisation of goals and behavioural programmes. The second concludes the behavioural act with the necessary result, gives the animal information on the more important properties of objects and their associations, on the most successful modes of action with them.

The above makes it possible to reply to the antinomy: is thinking a characteristic of the brain or the animal? Though psychic processes, as we saw, are implemented primarily in the brain of an animal, the latter thinks also in the process of direct actions with objects. And most important: as it is the psyche that forms a part of the behavioural act of the animal, and not the brain or working organs as such, so it is the animal and only it that thinks. The animal, and not the brain, possesses needs, motives, behavioural goals; the results of behavioural acts are needed above all by the animal, and only then also by its organs, whose actions are guided by the subject.

Let us now examine the common features of human consciousness and the psyche of animals. The similarity is obvious. First, man's consciousness is also "interwoven" with his behavioural acts, i. e., in the practical acts of transforming objects and acts of communication and speech, constituting one of their aspects. Second, the experiments conducted by P. K. Anokhin and others have proved that the structure of people's behavioural acts and consciousness, as their aspects, is identical to that of animals. In the human brain there is also a mechanism of "afferent synthesis", adoption of decisions, and there also operates a system of transmitting information from the working organs to the "acceptor of action", etc. Third, people in principle possess identical with animals sensory forms of reflecting reality — feeling, perception and notion, with the aid of which they produce in the brain the external characteristics and associations of objects, phenomena. We note, fourthly, that emotions are also intrinsic to man, inducing him, as they do animals, to actions, with the aid of which he assesses the results of his actions and the condition of his organism.

Characterisation of the common features of the psyche of animals and man makes it possible to define it as a whole. Psyche represents an essential aspect of the behavioural acts of both animal and man, ensuring satisfaction by them of their biological needs through: (a) reflection by them, on the basis of the information obtained from the sensory organs and past behavioural experience in a sensory-image form, of the more

important environmental phenomena; (b) transformation of the results of this reflection into goals, programmes of future actions of working organs and regulation of the latter for the achievement of the former; (c) the actions of emotions, predetermining the activity of subjects, their ability to assess external phenomena and the results of actions with respect to their usefulness or harmfulness, satisfaction or non-satisfaction of an organism's needs. An important feature of the psyche is its direct association with the actions of working organs and sensory-image reflection of reality, which ensures the subject the possibility of satisfying his biological needs.

So, the human psyche resembles in many ways that of animals. What distinguishes it from the psyche of animals, making it a higher form, consciousness?

As noted above, people living in society must engage in a multitude of diverse types of activity — labour, political, religious, educational, etc. Let us examine the principal ones — labour acts and acts of communication, which lie at the basis of all other types of human activity.

All acts of human behaviour, especially those of labour and communication, are *social* in nature. This is borne out above all by their unbreakable interrelation (for instance, workers of different specialities are connected with one another inside an enterprise, etc). As we have seen, human acts of behaviour are carried out with the aid of artificial means created by society, and that ultimately their results also belong to society.

The new, social essence of human acts of behaviour predetermines also the qualitative

distinction of their psychic aspects from the acts of behaviour of all animals, imparting to it a social nature, which must be expressed in new forms of reflection (for sensory forms are incapable of reflecting the social needs of people), in its new functions and features.

Especially interesting in this sense are human acts of communication. By their structure they are in principle analogous with ordinary acts of behaviour in production. They are also characterised by a close unity of the psychic aspect and the natural aspect, in which the role of working organs is performed by the organs of speech, and by the division of acts of communication, (and hence also their psychic aspects) into an internal and external part. Acts of communication are carried out above all under the influence of man's social needs and with the aid of means evolved by preceding generations — primarily that of language.

However acts of communication also possess features of their own, which determine certain specific properties of consciousness. They are accomplished under the influence of social needs in the accumulation of social information and its fixation in words, books, magazines, etc., the need to pass it on from one person to another for the successful attainment of common practical goals. Unlike acts of labour, in which objects are processed, in acts of communication with the aid of language, instead of implemental means, it is the knowledge of people, their intentions, goals that undergo change.

Implicit in all this is the qualitative difference of the psyche of people and that of animals. In their acts of behaviour people must reflect specific

social needs, which compel them to transmit knowledge and the social experience of behaviour to other individuals and, conversely, receive them from other members of society. In the process of thinking people accomplish through language the processing of social information *in anticipation* of practical actions, whereas animals think only during implemental actions. With the aid of words man expresses in notions the essential features and regularities of the world of phenomena around him, distinguishes himself from it.

So, the main feature of the human psyche, and thanks to which it is transformed into consciousness, is its social nature: it reflects the social life of people, their common needs and common norms of behaviour, their dependence on each other. This fundamental essence of consciousness was very aptly expressed by Marx and Engels: "Consciousness ... can never be anything else than conscious being ... and the being of men is their actual life-process."[1]

The actual process of people's common life is extremely varied. It includes the social production of material wealth, the social upbringing of children, the political struggle of the classes, the creation of works of art, etc. Different types of common activity by people and their social existence result in identical political, aesthetic, religious, scientific and other ideas, knowledge, feelings, experiences. Thus, developed in people who engage in artistic creativity is a feeling for beauty, for the beautiful. It does not appear

[1] Karl Marx and Frederick Engels, "The German Ideology", in: Karl Marx and Frederick Engels, *Collected Works*, Vol. 5, Progress Publishers, Moscow, 1976, p. 36.

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outside artistic practice. Similarly, the political activity of the classes, the working masses generates in them common convictions, feelings, moods.

The above makes it possible to reply to another antinomy as well: is consciousness social or individual? Undoubtedly the philosophers who assert that consciousness is individual are correct, for it exists only in the minds of individuals. But it is an incontrovertible fact, other thinkers counter, that social consciousness exists outside each person in the form of scientific, religious, legal and other ideas, knowledge and feelings... We all read books by long deceased authors, whose content does not depend on us; there exist outside us works of art, about which we may know nothing.

The key to the solution of this antinomy was found by V. I. Lenin. He stressed that both in reality and in the consciousness of people common characteristics, associations of individual objects, phenomena are inseparable from them, just as the objects themselves cannot exist without common characteristics, for they are always united in systems. "The universal exists only in the individual and through the individual. Every individual is (in one way or another) a universal. Every universal is (a fragment, or an aspect, or the essence of) an individual."[1] As applied to our case this means that social consciousness as the general content of the consciousness of individuals does not exist by itself, outside them, but only in them, through them. Consequently,

[1] V. I. Lenin, "On the Question of Dialectics", *Collected Works*, Vol. 38, Progress Publishers, Moscow, 1976, p. 359.

outside people there is not nor can there be either absolute ideas allegedly existing prior to them and outside them, nor extra human world will, nor divine ideas, etc. There exists directly the consciousness of presently living, acting people. Whereas social consciousness exists through mediation, through the existence of the consciousness of individuals and insofar as it has entered them. At the same time the consciousness of each individual will be social to the extent that it absorbs the knowledge, ideas and behavioural norms accumulated by humanity.

Hence, human consciousness is individual by its existence, as well as the psyche of any animal is individual by its existence. But in its essence it is social. And that is its most important point.

All its other distinguishing features ensue from the social essence of man's consciousness. For all their similarity with the sensory images of animals, the sensory images of people differ from them. They are richer in content, for in social life man enters into definite relations with an endless variety of phenomena, while an animal correlates itself only with a narrow circle of phenomena that are biologically significant for it. Man's sensory images are inseparably linked with his notional thinking and are always expressed in the form of judgements. When looking at a lily, we perceive not merely the combination of form, colour, smell and its other characteristics, as is the case with animals, but simultaneously mentally form the given combination of characteristics with a judgement: "it is a lily". Finally, the main content of man's sensory images is

social, for he gets it from the speech of people, from books, films, etc.

An important feature of man's consciousness, which expresses its social nature, consists in that it reflects reality in the form of notions, theories, opinions, etc. We shall acquaint ourselves briefly only with notions.

As distinct from the sensory images of objects, notions are the common patrimony of people. They are social in their content, which is shaped and passed on from generation to generation and reflects the essential properties of objects and phenomena, in their regular associations, and in the verbal, linguistic form of expression, thanks to which they exist outside an individual (but not of all people) in the form of book texts, diagrams, formulas, etc.

Notions are divided into the empirical and theoretical. The former reflect the associations and properties of individual objects that are important for man's labour and other types of social activity. These are notions of colour, weight, size, etc. The latter appear together with science and express (again in a linguistic form) the significant, intrinsic properties and associations of objects, and also the laws of the development of nature and society. These include, for example, the notions of electromagnetic and gravitational fields, mathematical notions, etc. Since in this book we deal with the genesis of consciousness, we shall speak about the origin of empirical notions, which brought already the first people enormous advantages in comparison with sensory images. The experience of cognition and transformation of objects accumulated over numerous generations, knowledge of the charac-

teristics of objects contained in them, helped people more freely to orient themselves in the environment, better to foresee future events and the results of their own actions.

The social nature of consciousness and the notional form of its content make notional thinking essentially social. Combining notions according to the laws of logic, i. e., thinking, man can understand and express in words the deep-going associations of phenomena, clarify which of them is the cause, and which the effect, draw up long-term plans of joint actions, etc.

Will is an important characteristic of an individual's social consciousness. Social acts of man's behaviour that are not directly linked to the satisfaction of biological needs and which often require of him enormous physical and psychic effort, presupposed the forming of new psychic qualities, such as conscious attention, perseverance, persistence in achieving set social goals, and conscious regulation of one's own activity. All these qualities are designated by the notion of will. It is will that helps people overcome tiredness, exhaustion and other difficulties in achieving set goals. Karl Marx stressed that in the process of labour man must subordinate his will to a conscious goal and that "this subordination is no mere momentary act. Besides the exertion of the bodily organs, the process demands that, during the whole operation, the workman's will be steadily in consonance with his purpose. This means close attention. The less he is attracted by the nature of his work, and the mode in which it is carried on, and the less, therefore, he enjoys it as something which gives play to his bodily

and mental powers, the more close his attention is forced to be."[1]

The social behaviour of people predetermines yet another important trait of their psyche — social emotions, human feelings: collectivism, mutual assistance, solidarity, responsibility for common affairs, etc. As distinct from biological emotions such as satiety or hunger, these feelings (which help people carry out different types of joint activity) are social in nature and role.

The supreme manifestation of the social nature of consciousness, which unites in itself all the enumerated as well as other properties, is self-consciousness. It expresses man's attitude toward society, class, nation, country, to their needs, and enables him to distinguish himself from them, to realise himself as a personality. Man's self-consciousness makes it possible for him to assess his abilities and potentialities, his behaviour in the light of generally accepted norms. Not a single animal possesses self-consciousness, including the higher apes that have been taught the language of gestures (which will be dealt with later on). As one scholar aptly put it, not a single ape gives thought to which species it belongs.

So, human consciousness represents the highest form of the psyche's development. As psyche, it includes sensory forms of reflecting reality. As its highest form, it is social in essence — reflecting social needs, laws of the development of nature and society. This essence is manifested in self-consciousness, notional thinking, will, feelings and other features inherent only to people.

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[1] Karl Marx, *Capital*, Vol. I, 1984, p. 174.

CHAPTER TWO

THE BEHAVIOUR AND PSYCHE OF HIGHER APES

The psyche of animals, as already noted, represents an aspect of their behavioural acts, which is characterised, first, by the reflection, in ideal sensory images, of environmental phenomena and actions with them that are necessary for the normal vital activity of animals; second, by the transformation of these images into ideal goals and programmes of future actions; and third, by corresponding emotions that ensure the carrying out of behavioural acts. Understandably, the more developed an animal is, the more perfect the construction of its brain, sense and work organs, the more perfect its psyche. Numerous observations of the life and behaviour of anthropoids confirm the correctness of this conclusion.

§ 1. The Behaviour and Psyche of Higher Apes in Natural Conditions

A. Bodily Structure of Higher Apes as the Basis of Their Behaviour and Psyche

No other animal, apparently, has been studied as carefully as the chimpanzee and the gorilla. This is understandable — people had long since noticed these animals' similarity to man and sought to clarify the degree of this similarity. Already Charles Darwin and his followers Tho-

mas Huxley and Ernst Haeckel established several hundred common features in the bodily structure of these apes and man, including such important ones for their behaviour and psyche as the large size and complex structure of the brain (the size of the gorilla's brain, which is distinguished by its complex structure, amounts to upwards of 500 cm^3). The chimpanzee's brain is also noted for its complex structure. In particular, its brain, like that of man, has a developed frontal part, ensuring control over the formation and realisation of complex forms of behaviour. Studies of the structure and functions of all organs of sense in both anthropoids and man have shown their complete identity, which also bears out the great similarity of behaviour and psyche of the higher apes and man. Obviously, if the structure and functions of organs of sense and the corresponding parts of the brain in man and in anthropoids are in principle identical, it signifies that they both reflect identical characteristics of the phenomena around us and in identical sensory images — feelings, perceptions and notions. Observation of chimpanzees and gorillas have shown that they notice more details in the environment than a human being. The prominent Soviet researcher of the behaviour and psyche of the chimpanzee N. N. Ladygina-Kots arrived, on the basis of numerous experiments, at the conclusion that, in terms of the functions of the organs of smell and sight, even "a baby chimpanzee is superior to a mature man"[1].

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[1] N.N. Ladygina-Kots, *The Young of Man and the Young of the Chimpanzee*, Moscow, 1935, p. 490 (in Russian).

The anthropoids' bodily structure ensures a high level of their behaviour and psyche and other peculiarities, which distinguish them from other animals and approximate them to man. These include a relatively large body size and enormous physical strength. Among gorillas, for example, one can come across specimens weighing up to 250 kg and reaching 180 cm in height. The chimpanzee is also quite strong physically, greatly surpassing a human being in strength. These peculiarities of higher apes enable them to carry out a great variety of actions with large and weighty objects, thereby enriching their experience and behaviour, their knowledge, and psyche as a whole. The specifics of the bodily structure of higher apes is also manifested in the structure of their pelvis, vertebra and legs, making it possible for them, however imperfectly, to walk erect. And this, in turn, facilitates their orientation in their environment, in acquiring a better knowledge of it, on the one hand, and improvement of the structure and functions of the apes' main working organ — arm and hand with digits, with the aid of which they are able to carry out the most diverse, including very delicate, actions with the objects around them, on the other. Since, as we will recall, the working organs are directly linked with the brain in acts of behaviour, the high development of the psyche of the gorillas and chimpanzees is also determined by the articulation and functions of their hands. In this respect it is interesting to compare anthropoids with the Cetacea. Dolphins, for instance, possess a highly organised brain, surpassing appreciably in size that of the gorilla and chimpanzee. However, the lack of working organs

capable of diverse actions with objects and the uniformity of the marine environment does not permit them to use the brain's potentialities for a more complex behaviour and psyche in natural conditions. And these potentialities, as shown by numerous tests with dolphins, are considerable: they are able to solve diverse problems alone and together, to conduct themselves purposefully in different situations, use their fins for actions with balls and other objects, etc.[1]

Thus, the bodily structure of higher apes is a good basis for their performing quite complex implemental and communicative acts of behaviour in natural as well as in experimental conditions. The above-noted similarity of the gorillas' and chimpanzees' bodily structure with that of man makes it possible to deduce a definite similarity of their psyche and the psyche of man. But for the solution of our task it is important to take into consideration also the qualitative difference between the bodily structure of man and that of anthropoids, its influence on the corresponding difference of their psyche.

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[1] See: Forrest G. Wood, *Marine Mammals and Man*, R. B. Luce, Washington, 1973; R. G. Basnel, A. Classe, *Whistled Languages*, Berlin-Heidelberg-New York, 1976; M. C. Caldwell, D. K. Caldwell, "Vocalization of Naive Captive Dolphins in Small Groups", *Science*, Vol. 159, No. 3819, 8 March 1968, p. 1121; T. C. Lang, H. A. P. Smith, "Communication Between Dolphins", *Science*, No. 3705, 1965, p. 150; J. C. Lilly, *The Mind of Dolphin. A Non-Human Intelligence*, Doubleday, New York, 1967.

B. Individual Behaviour and Psyche of Anthropoids in Ordinary Life

Long years of observation of the daily life of gorillas and chimpanzees in their natural habitat in the tropical forests, mountains and plains of Africa have shed light on various aspects of their life. It has been ascertained that these apes are capable of successful (the gorillas more slowly, the chimpanzees faster) arboreal and ground movement. They spend most of the day on the ground (especially the chimpanzees), and every night build primitive nests in trees. The main food of the chimpanzees and gorillas are the gifts of the tropics: fruits, leaves, roots, shoots, etc. A prominent British research Jane van Lawick-Goodall has defined more than 90 different species of tree and plant, 3 species of ant, 2 species of termite, and also honey, bird's eggs, etc., used by chimpanzees for food.[1] Unlike the gorilla the chimpanzee occasionally hunts small animals and birds and takes pleasure in eating them. Scientists have recorded repeated cases of chimpanzees hunting for baby baboons, birds, rodents, etc.

A primarily low-calory vegetation diet determines the life style of the gorillas and chimpanzees. They spend most of the day in search of and eating vegetation, with which they continually stuff their stomachs. Only for short periods do they rest or occupy themselves with other affairs. True, the chimpanzees, being smaller than the gorillas, are more quickly sated,

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[1] Jane van Lawick-Coodall, *In the Shadow of Man*, Houghton Mifflin, Boston, 1971, p. 281.

leaving them more opportunities for diversifying their lives, for the complexification of their behaviour.

Of interest in this context are new data on the implemental activity of the chimpanzee, received by Jane Goodall in the Gombe Stream National Park (Africa). The researcher observed the chimpanzees repeatedly using tools for the most varied purposes. They use stalks and twigs to catch insects; moreover, in case of need "improve" and modify them, using leaves to scoop up water which they cannot reach with their lips. Chimpanzees occasionally use sticks to widen the entrance of a nest of ground bees. Jane Goodall was especially struck by the fact that the chimpanzees picked up small twigs or liana vines and, passing them through a closed fist, cleaned them of leaves, making them suitable for use, i. e., for digging termites and ants out of their nests. Besides, both the chimpanzee and gorilla are capable of using sticks and stones as a means of defence and attack. The life style of these anthropoids, which is characterised by continual movement from place to place, search for different kinds of food, averting danger, etc., helped evolve in them, particularly in the chimpanzee, an orientation-research instinct, i. e., an inborn need to study everything and everybody in their vicinity, feel and break up objects, especially unfamiliar ones, and use them for their own purposes.

These distinctive features of anthropoid life and behaviour attest to a considerable complexity of their psyche. Implemental activity constantly enriched the individual experience of an anthropoid's behaviour during his lifetime, i. e., knowledge of the properties and associations of the

phenomena around him, their significance for each individual, necessary actions with them, etc. Obviously chimpanzees and gorillas would be incapable of complex acts of behaviour without an adequately developed ability to memorise the properties of objects and results of actions with them, without a psychic ability to "vivify" the corresponding ideal images of these objects and actions with them. A big role in the vital activity of gorillas and chimpanzees is played by their persistence in the achievement of a necessary goal, which is determined by an orientation-research reflex, as well as their various emotions.

All the above-mentioned traits of the anthropoids' psyche were used by them for the preliminary mental solution of vitally important problems of behaviour with respect to their habitat (practically uninterrupted search for food, averting of danger, etc.), as well as with respect to their fellow herd members. The considerable complexity of the higher apes' psyche and its tremendous importance for survival and propagation consisted above all in the timely and biologically expedient accumulation and subsequent use of the knowledge received during their life, the preliminary transformation of this knowledge into concrete goals and programmes, continuous control over the successful implementation of the latter until the need operating at a given time is satisfied.

Of enormous interest are the experiments of Soviet primatologist L. A. Firsov in revealing the nature of chimpanzee psyche. In 1972-76 he took a group of young chimpanzees to an uninhabited island on a lake in the Pskov Region. Careful observation of the chimpanzee's adaptation to

new natural conditions helped clarify the peculiarities of their psyche. It was established that the chimpanzees possess a highly developed image memory of the properties of objects and actions with them. Thanks to it they readily found their bearings in the locality within a few years. This peculiarity of the chimpanzees, together with different types of implemental activity, determined their ability to generalise surrounding objects by colour, size, form, and other important parameters, clearly to differentiate phenomena and objects according to them, and to classify them. "This, probably, is the most important thing," L. A. Firsov stressed, "that distinguishes the implemental activity of the anthropoids from that of other animals."[1]

C. The Herd Behaviour of Anthropoids and Their Psyche

A tremendous amount of diverse material has been accumulated about the herd life of apes. We shall single out only data collected by European, Soviet, US and Japanese researchers regarding the life of a herd of chimpanzees, and partially of gorillas, as the most complex and diversified.

The size of chimpanzee and gorilla herds varies from 20 to 30 individuals. Their composition is quite stable and includes, as a rule, several adult males, females with their offspring, and young animals of both sexes. The latter, especially

[1] L. A. Firsov, *Behaviour of Anthropoids in Natural Conditions*, Leningrad, 1977, p. 175 (in Russian).

the males, represent the mobile part of the herd, capable of going over to other herds.

It has been established that the determining role in the life of a herd is played by adult females. It is they who look after the new-born, pass on necessary knowledge and experience of behaviour in the herd and outside it. Constantly formed around the females are groups of individuals comprised of their offspring from the smallest to 10-11 year-old apes, which defend each other, help each other in procuring food, and constantly communicate with each other. The stature of the females in the herd hierarchy largely determines the position of their offspring in a herd. The males take practically no part in caring for the offspring; their responsibility consists in upholding order in the herd, protection of its members from external danger, etc.

The key principle of the organisation of a herd's life is the hierarchical system of co-subordination of its members, i. e., subordination of each hierarchically lower member of the herd to a higher one. The herd is usually headed by the most experienced leader, who together with other adult males ensures the normal day-to-day life of the rest of its members and the herd's security. Conflicts are usually solved by peaceful means and without delay. An older member need only glance at a younger one or adopt a threatening pose for the latter to yield the right of way, food, move away from a female, take up a subordinate pose. In addition it is not the physically strongest males who become leaders but, as already noted, the most experienced and cleverest, i. e., those who are distinguished by a high level of psyche. In confirmation of this idea we refer

to one of the numerous facts cited by Jane Goodall. The young male Mike, living together with a herd at a rearing station, once snatched up two empty petrol tanks and, rattling them, rushed at a group of adult males. Repeating the operation several times, he frightened them and became the herd's leader. The young male's cleverness, good nature and other favourable for the herd psychic qualities enabled him successfully to carry out for a prolonged period the far from easy functions of a leader.

The complex life of the chimpanzees and gorillas in herds would be impossible without the corresponding means of communication. These include diverse sounds, of which the chimpanzees possess more than the gorillas. They may be subdivided into four basic groups: sounds of excitement, sorrow, anger and joy, and they fulfil the most diverse functions. First, with the aid of sounds each herd member announces its condition and needs: appeals to its elders for food or assistance, invites others to play or take part in joint actions, etc. Second, with the aid of sounds they signalise danger from the external environment, events. Noted immediately should be the fundamental difference between the sounds produced by the anthropoids and the speech of people. The former are not linked by a definite system, express primarily the individual emotional condition of herd members and do not reflect definite properties of objects of the environment, whereas the latter represents a continually developing (from generation to generation) system of sounds that is social in nature, containing the accumulated knowledge of society about the environment and about itself.

The prominent Soviet primatologist N. A. Tikh noted that "the more a sound is associated with emotions, the less anthropomorphic it is."[1] It is this kind of sound that is characteristic of chimpanzees, and especially of gorillas.

Extremely diversified and important with anthropoids is the so-called language of gestures. It includes gestures of threat, gestures attracting attention for satisfaction of the need for a search or play, gestures arousing to definite actions (search for food, punishment for a misdemeanour, etc.), camouflage of future actions (seizure of prey, distraction of attention), conveying one's wishes, condition to other herd members, regulation of relations among herd members on the part of the leader, etc. As in the case of sounds, the gestures of apes are purely biological by nature; they express only emotions and the individual needs of herd members, are inseparable from a situation, and compulsory in character. A communicative role is also played by the diversified facial expressions of apes, denoting fear, joy, revulsion, etc.

On the whole, the means of communication are the most developed in herds of anthropoids in comparison with all other animals; they fulfil diverse biological functions for the ensurance of a herd's normal life.

The anthropoids' elaborate means of communication, and the flexibility of their use underlie the diversified and personal, virtually intimate nature of relations between them. Numerous observations clearly show that friendly relations

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[1] N. A. Tikh, *The Pre-History of Society*, Leningrad, 1970, p. 210 (in Russian).

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appear and exist for a number of years between herd members, especially between the offspring of one mother. At the same time relations between herd members may be opposite in character, i. e., as in the case of people, these can be relations of hostility, disregard, antipathy, etc.

All this, undoubtedly, attests to the highly developed psyche of the chimpanzees and gorillas. It is the complex herd life that compels all community members to be continually on the alert, react instantly to the constantly changing environment, resolve problematical situations, that determines the development in these apes of such qualities as cleverness, cunning, memory, attention, etc.

With good reason many researchers note the similarity of a number of features of the psyche of higher apes and man. With both people and anthropoids fear induces a striving to touch someone near them, the feeling of joy arouses similar actions in the form of kisses, hugging, etc. In addition there is the above-noted similarity of sensory reflection of objects both in content and form (feeling, perception, notion) with anthropoids as well as with people, the ability of the former to solve on the level of two-year-old children comparatively complex practical problems.

Is it conceivable, then, that the chimpanzee and gorilla possess rudimentary consciousness? A number of scientists reply affirmatively. Thus Jane Goodall asserts that there is also a dawning awareness in the chimpanzee, only "man is aware of himself in a very different way from the dawning awareness of the chimpanzee", and this difference is no greater than that between

the psyche of the chimpanzee and other animals. "Just as he is overshadowed by us, so the chimpanzee overshadows all other animals," writes Jane Goodall. "He has the ability to solve quite complex problems, he can use and make tools for a variety of purposes, his social structure and methods of communication with his fellows are elaborate, and he shows the beginning of Self-awareness."[1] At the same time many specialists from different countries stress the fundamental difference between the consciousness of humans and the psyche of anthropoids. Before analysing the arguments of one or the other view and solving the problem as a whole, let us examine some recent experimental data characterising the vast possibilities for development of the psyche of higher apes and, consequently, its approach to human consciousness. Understandably, the comparison of human consciousness with the maximum possible present development level of the psyche of apes will be strictly scientific.

§ 2. What Are Higher Apes Capable of in Experimental Conditions?

Back in the 1920s the prominent Soviet biologist A. N. Severtsov established an interesting regularity in the behaviour of higher animals: they adapt themselves to the conditions of existence primarily by changing behavioural acts and not thanks to their bodily structure, and in this respect they possess enormous reserves, a

[1] Jane van Lawick-Goodall, *Op. cit.*, p. 252.

"spare brain", with the aid of which in their life process they are capable of successfully resolving various, occasionally even quite complex problems.[1] Subsequent numerous experiments on a wide range of animals, especially beasts of prey and, of course, on anthropoids have confirmed this premise. Drawn up at present have been a series of methods for revealing the apes' capacity for a variety of intelligent actions — opening "difficult" bolts, reaching baits with the aid of diverse objects, search for roundabout ways of reaching goals, etc. To carry out our task it is advisable to examine three directions of work with anthropoids. First, clarification of the psychic capabilities of anthropoids in the process of their using various objects, and also the preliminary preparation of the latter. Second, clarification of the psychic capabilities of higher apes in the process of joint activity. Third, clarification of the psychic capabilities of apes in the process of teaching them the language of gestures. If the first two directions permit revealing the possibilities of the higher apes developing by themselves, the third is interesting in that the apes are being educated in completely new, social conditions and with the aid of the latter developing their psyche.

[1] See: A. N. Severtsov, *Evolution and the Psyche*, Moscow, 1922 (in Russian).

Out of a whole series of such experiments we cite only a few that have become classic. One of the first of these experiments with a group of young chimpanzees was conducted by the German scientist Wolfgang Köhler at an experimental station for anthropoids situated on Tenerife in the Canary Islands. The chimpanzee Sultan showed himself the most capable of the seven individuals in the experimental group. Beginning with the use of diverse objects, primarily bamboo sticks and poles, to reach a bait, Sultan was soon able to "prepare" and combine various objects to achieve his goal. Thus, he unwound a spool of wire, with the aid of which he reached the bait, then learned to put together first two, and later three bamboo sticks and to skilfully use the pole thus formed to draw closer a distant fruit. Sultan also mastered such far from easy ways of reaching a goal as piling up boxes to reach a bait hanging high above, and emptying a box of heavy stones. He found it much harder to learn to first push a bait with a stick in order to reach it. Similar experiments were conducted with chimpanzees and gorillas by other foreign and Soviet scientists, and all produced similar results. In particular, the Soviet researcher N. N. Ladygina-Kots conducted with the chimpanzee Paris a series of experiments on reaching a bait in a pipe with the aid of different objects — sticks, wires, etc.— some of which he specifically prepared for the purpose. In an experiment by another Soviet scientist, G. F. Khrustov, the chimpanzee Sultan learned to break off sticks from

a round oak disk, which he later used to reach a bait.

What psychic properties do these experiments attest to? Today the majority of specialists agree with W. Köhler's initial conclusion to the effect that anthropoids possess integral images of the objects and situations in which they act, and it is with their aid and on their basis that a chimpanzee successfully carries out the rational chain of his actions. Without sensory-image notions about the items it uses and also without an image-goal, which must be reached, a chimpanzee would be unable to carry out the above-described actions and satisfy its needs.

However these experiments illustrate something else as well. In accordance with P. K. Anokhin's theory of functional systems mentioned earlier, in such acts of behaviour the experimental chimpanzee implements a synthesis of sensory images of the situation with the images of past acts of behaviour that appear in his mind during his actions, transforms the results of this synthesis into ideal goals and programmes for future actions, assesses and corrects the results of the latter. Thus, the results of experiments point to the complex psychic activity of chimpanzees and the similarity of several characteristics of their psyche to that of human consciousness.

Of great interest are the numerous experiments with anthropoids to ascertain the specifics of their thinking. Under I. P. Pavlov's guidance a series of experiments was conducted with the adult chimpanzee Raphael, as a result of which it learned to solve a number of complex problems, demonstrating its capacity for thought. In one experiment the chimpanzee acquired the knack

of carrying out a whole sequence of actions for reaching a bait. First it turned the handle of a box and after the bell went ran to the feed bowl for the reward. Then Raphael learned to press the button of the bell to receive the bait. Finally, it managed to join these two skills into a single chain of actions: turned the handle, ran to the bell, pressed the button, ran to the feed bowl and received the well-earned reward. In the following series of experiments Raphael managed to carry out an even more complex chain of purposeful behavioural acts. Placed on a float in the middle of the lake was a box with the bait, access to which for Raphael, who was on the same float, was cut off by fire. To extinguish it, the chimpanzee carried out consistent actions it had been taught earlier. First Raphael went up to another box situated on the float, dropped a cube into a hole in it and received a mug. Then the chimpanzee picked up a pole lying nearby and with its aid went over to the neighbouring float, where there was a tank of water. Opening the faucet and filling the mug, Raphael returned to the first float, extinguished the fire and received the bait.

The anthropoids' complex actions bear out above all their capacity for thought. And thinking is a psychic process, which includes, first, the use of past behavioural experience in new conditions and for the solution of new problems and, second, the carrying out, on this basis, of preliminary actions for the achievement of the desired result. In the above series of experiments the chimpanzee demonstrated the kind of behaviour which I. P. Pavlov called "manual" or implemental thinking, i. e., thinking in the process

of manipulating objects with the aid of the hands.

It is obvious, however, that the chimpanzee's behaviour and thinking, for all their apparent complexity, differ greatly from the thinking and behaviour of man. This difference consists in that an ape thinks and acts under the influence of its biological needs. A very hungry individual is either totally incapable of intermediary actions, or does everything hastily, making a lot of errors. To a certain extent such behaviour is also characteristic of humans, though in principle man, unlike all animals, is capable of acting contrary to his biological needs. Other features of the psyche of anthropoids are also biologically determined, and consequently, so is their behaviour: attachment to a situation and to the objects they manipulate and which they influence, the stereotyped character of their actions. In the last of the above-described experiments Raphael had an opportunity to scoop up water directly from the lake, instead of performing the complicated chain of actions. However, the chimpanzee began scooping water directly from the lake only after a number of unsuccessful attempts to resolve the problem the usual way—always finding the tank empty. The chimpanzee's stereotyped behaviour in the described experiment was also due to the fact that the sensory images — in this case the images of the tank, float, the water in the lake, the tank, etc.— are always concrete, inseparably linked with the reflected objects and situation. Hence for Raphael the water in the lake and the water in the tank were completely different phenomena of the environment, compelling him to perform different actions with them. With man the notion of water

embraces all its concrete manifestations, making it possible for him to freely find his bearings among them, to dissociate himself, in his abstract, notional thinking, from immediate actions and situations, to grasp the internal causal and other important associations of the environmental phenomena.

Since the reflection of deep-going causal associations represents an important feature of man's consciousness, it is fitting to compare man with anthropoids also in this respect. The results received back in the 1930s by the American zoopsychologist John Wolf in a series of experiments with six young chimpanzees prove interesting. In these experiments Wolf used token awards varying in shape and colour. First he dropped a token into an automatic dispenser before the eyes of the apes, and they rushed to the bowl into which the bait fell from the dispenser. As a result for them there appeared a conditional association between the token and the bowl with the bait. On receiving a token, the apes ran to the machine but instead of dropping it into the slot, they placed it in the bowl in which the feed appeared.

The second stage of Wolf's series of experiments was teaching the chimpanzees to establish an association of the token with the slot in the machine: only in that case did they receive feed. Whereas 40 attempts were required to develop the first conditioned association for the chimpanzee Bon, the formation of the second one required 237. True, the apes that showed a better ability to imitate the experience of other individuals, achieved the result much quicker. Then the apes were given different colour tokens; by

dropping them in the slot they received different kinds of bait: for a white token — feed of some kind, for yellow ones — water, etc. At the same time no bait was given for plain metal tokens. The chimpanzees relatively easily grasped the "purchasing" power of the tokens: from among the tokens scattered in the premises they chose the ones that satisfied their actual needs, completely ignoring the metal tokens. Applying I. P. Pavlov's theory of conditioned reflexes, we can say that a differentiation of previously-formed conditional and temporary associations between tokens and automats took place in the experimental apes in accordance with the needs operating at a given moment.

In the following series of experiments Wolf made the chimpanzees "work": to receive the necessary coloured token, which they then used for their intended purpose, the apes had to press a lever in a corresponding machine. The value of the tokens for different kinds of food, toys, etc., had been determined beforehand for the apes by pressing a lever a corresponding number of times and adding different kinds of weights to them. Deliberately selecting this or that token, the apes actively expressed their desire: to play with the experimenter, go for a walk with him, return to their cage or, on the contrary, to the room to receive new tokens they needed, etc. After this a series of experiments were conducted with the chimpanzees (we shall deal with them later), in which a study was made of their aptitude for cooperative actions, exchange of tokens, etc.

How to assess the level of development of a chimpanzee's psyche in the above cited expe-

riments? Can it be compared to the psyche of man? We believe that the results of the above and other experiments along the same lines do not confirm such an evaluation of the psyche of higher apes.

First, all the complex chains of action carried out by the apes during the experiment were determined by biological needs identical to those of ordinary apes in their daily life. In both cases the beginning and end of actions is determined by the satisfaction of one or another need, a change of behavioural acts takes place after and on the basis of a change of needs. As distinct from men, apes have no other stimuli of behaviour, and hence no other goals for it. The behaviour of higher apes in experimental conditions differs from their behaviour in natural conditions only by its greater complexity and activeness. Second, the rules of evolving chains of behavioural acts in experimental chimpanzees, the mechanism of their formation, and actions as a whole fit in the framework of I. P. Pavlov's theory of conditioned reflexes. As is the case with ordinary conditioned reflexes spontaneously developed by animals in natural conditions of existence, biologically neutral phenomena (smells, colour, etc.) begin to denote biologically important phenomena. In the cited experiments the tokens became for the apes signs of receiving objects necessary for the satisfaction of their needs. In natural conditions as well, higher animals, having established a temporary conditioned association between neutral phenomena of the environment and those that are biologically important for them, undertake the necessary actions to achieve the latter (hide, steal up

to prey, etc). It should be borne in mind that a temporal association of phenomena, as a rule, expresses a superficial, external, but causal association between them (for example, between a lowering of atmospheric pressure and rainy weather, the presence of an individual feature of an object and its existence, direction and speed of movement of a victim and its possible location, even when not in sight, etc). On the above examples we became convinced that experimental apes also establish a causal association between tokens and future, biologically useful objects, between corresponding acts and their results.

Finally, these experiments established that the apes' acts which were not corroborated by a reward resulted in a "waning" of the established temporal association between the token and the machine (exactly in the same way as the non-corroboration of conditioned reflexes lead to their "waning"); the apes lost interest in the tokens, and in the machines and actions with them or began to shake and strike the machine which failed to give them the desired reward.

Let us now examine the experiments for the development and manifestation of the psyche of behaviour of higher apes in the course of their cooperative actions.

Regrettably, compared to experiments with separate individuals, such experiments are far less numerous, which is due to a shortage of suitable apes, their incompatibility with each other, as well as the specifics of their relations with each other in communities. As noted above, the law of ape community life is a hierarchical system of organisation with mandatory subordination, though to a varying degree, of lower-ranking

individuals to higher-ranking ones. Given the organisation of an ape community's life on such principles, many of its members have scant opportunities for independent behaviour and, hence, cooperation on the part of subordinate individuals is limited, which negatively affects the joint solution of common problems by community members. In addition, the results of their actions (i. e., feed, toys and other biologically important objects for the life of apes), which are carried out after the adoption of decisions, are, as a rule, appropriated by the leader which, naturally, reduces the activity of his assistants. That is why the experiments in organising cooperative actions are usually conducted with young chimpanzees or adult anthropoids in which relations of domination and subordination are still undeveloped, and great importance attaches to their essentially selfless play activity.

The direct basis of the cooperative actions of higher and lower apes in both natural and experimental, laboratory conditions is an innate striving for herd life (the herd instinct). They cannot exist without daily communication with each other. Another basis of their cooperative actions both in freedom and in captivity linked with their striving for life in a herd is a highly developed ability to imitate each other's actions. As shown above, the life of apes in a herd is psychically a very intense one. They continuously watch each member, especially the behaviour of the leader, and hence are always ready for cooperative actions with him and other herd members. In experiments on the organisation and study of joint actions by anthropoids these peculiarities of their behaviour and psyche

are improved appreciably by prolonged training, and the creation of corresponding conditions. Also taken into account are the individual traits of all participants in the cooperative actions of apes, their attitudes towards each other, etc.

The aim of the study of the cooperative actions of higher apes was to elucidate the concrete stimuli and the forms of their manifestation, and also the degree of approximation of the cooperative activity of apes to that of man, and the evaluation of its character in comparison with the activity of man. Let us examine briefly the results of some of them.

Let us again address Wolf's experiments. Having taught the chimpanzees to use tokens of different colours, Wolf made them act cooperatively to acquire the tokens: some of the chimpanzees pulled the heavy box with tokens, turning a huge wheel; others extracted the tokens from it. This led to complex, diversified relations between the apes who extracted the tokens and those "working" for them. The apes who came into possession of the tokens were unwilling, especially at the beginning of the experiments, to give them to the members of the experimental group who helped them acquire the tokens; the latter, in turn, depending on their physical and psychical properties, attempted to use force or other methods to take away the tokens, moreover the ones they needed most. In their turn, the owners of the tokens were more willing to give away the ones which yielded the less interesting awards. Gradually, with the repetition of these and other experiments, the chimpanzees began showing a persistent tendency toward exchanging tokens

in accordance with the action and change in this or that need of the owner.

Wolf assesses the chimpanzees' cooperative behaviour in these experiments as, in principle, human. In his opinion the chimpanzees work, exert effort, expediently turn the wheel, exchange tokens like people do, i. e., use them as money, trade them, in pursuance of their own, selfish interests. Thus, Wolf not only endows his wards with human intellect, but attributes to them social characteristics, social behaviour, which is fundamentally erroneous.

Similar experiments with a group of 14 chimpanzees were conducted by Meredith Pullen Crawford and Henry W. Nissen. Separating the apes into seven pairs, the researchers made them pull together a box with food with the aid of two ropes. The joining of the efforts of two chimpanzees took place gradually. First they pulled the ropes separately, hampering each other, then they began coordinating their actions, while observing relations of subordination to the leader. Finally, with the aid of gestures one of the partners invited the other to cooperate, even when the latter was occupied with other affairs. Not all chimpanzees achieved such a level of cooperation. It should also be stressed that the result of cooperative activity was often appropriated by only one chimpanzee, the leader of a given pair, who forced the other chimpanzee to take part in moving the box, while the subordinate partner expressed his invitation to cooperative action only in the form of a request.

What is new in these and other experiments along the same lines in the sense of a comparative assessment of the psyche of anthropoids with

human consciousness? To answer this question let us examine first of all one of the key aspects of these experiments — stimuli of the apes' behaviour and the forms of their manifestation. One can readily see that at the basis of the co-operative actions of higher apes lie the same biological needs which determine their entire behaviour in ordinary conditions: chimpanzees "work" only when such of their needs operate as hunger, thirst, curiosity (orientation-study reflex), requirement for different forms of communication and play (especially in case of young individuals). That is why cooperative actions are readily interrupted and renewed, continually change their intensity, etc. The biological character of ape behaviour in these experiments is determined also by the operation of relations of co-subordination, moreover to a greater extent than in ordinary conditions, for the entire situation and complexity of the tasks heighten the intensity of the individuals' behaviour, their attitudes to each other.

Thus, in experimental conditions the stimuli and character of the need for cooperative actions by higher apes are entirely biological in nature.

To what extent in such a case do the forms of manifestation of stimuli and needs of the co-operative actions of apes approximate human *joint* actions? Obviously, the behaviour of apes in experimental conditions differs greatly from their behaviour in ordinary conditions. This is understandable — the former are much too specific, in terms of their complexity, compared to the latter. Moreover, the complexity, specificity of ape behaviour in experimental conditions consists

not only in the great variety of actions performed and their combinations, which are simply impossible in natural conditions of the anthropoids' life, but also in a significant complexification of their relations during cooperative actions and regarding the results of the latter. Researchers have recorded a whole complex of relations between participants in experiments, from complete mutual aid and coordinated actions to counteraction between the same individuals, but at different times and in different circumstances. Also discovered have been a great many nuances in relations between apes in experimental conditions in the sense of inducement to cooperative actions, use of various kinds of cunning, deceit, etc., aimed at achieving the goal set by each individual, especially regarding use of the results of the actions.

The diversity of implemental and communicative acts of the anthropoids' behaviour indicates a significant development of their psyche. The latter is manifested in the enrichment of the anthropoids' knowledge in the form of sensory images of a variety of objects and their manipulation, acquisition of new goals of behaviour, a marked intensification of psychical processes and experiences, etc. But in comparing the results of the studies of chimpanzee behaviour in experimental conditions with observations of the behaviour and psyche of anthropoids in ordinary conditions, we discover that the difference between them is purely a matter of quantity. Jane Goodall, whom we already referred to in this work, cites a number of examples of the use of cunning and deceit in relations between chimpanzees. Thus, the male Figgin, on discovering

a banana that nobody had noticed among the branches of the tree under which the leader was sitting, moved aside, from where he was unable to see the fruit and patiently waited for the higher ranking member of the community to go away and only then returned for it. When threatened by other apes Melissa, a lower-ranking female, "hurried to a higher-ranking individual, and while reaching out to touch him directed hand screams toward her aggressor", often not doing it immediately, but nursing a grudge while waiting for a favourable opportunity.[1]

It may be presumed that in experimental conditions enormous opportunities are realised for the cooperative actions of apes, which are latent in their behaviour and psyche. However, the observed progress of the main components of anthropoid psyche, beginning with the accumulation of sensory images of objects and their manipulation, and up to their creative use in different situations, methods of cooperative actions, remained within the boundaries of biological behaviour and psyche.

Thus, the above confirms that the opinion of a number of specialists who consider the psyche of apes as the lowest level of consciousness, its embryo, is unwarranted.

The above data provide no basis for making a qualitative distinction between the psyche of anthropoids in experimental and natural conditions, for assessing their cooperative actions as work, social actions, and their relations as social,

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[1] See: Jane van Lawick-Goodall, *Op. cit.*, pp. 78, 127, 128.

and specifically, the relations of the exchange of tokens as trade.

Let us compare the relations of apes in the process of their cooperative actions with the corresponding relations of men when engaged in some kind of work.

First, without taking into consideration the tremendous difference in the processes of human activity (in terms of the availability of various means, instruments, etc.) from the cooperative activity of apes, we stress the crucial point: human relations in concrete work processes are not restricted to them, but represent only an element of a more general production process and the social system as a whole. That is why the concrete goals of group production processes are determined above all by the goals of more complex social systems. Likewise, the results of the activity of groups, as a rule, do not serve the satisfaction of their own biological needs, but the needs of the social system to which they belong. Even what seems to be fully individual acts of purchasing and selling commodities are social in nature, for they are aspects of a whole system of acts of commodity exchange and are implemented for the aims of production, the accumulation of wealth, exploitation of other people, etc. Finally, relations between people in the production process, and outside it, are regulated by the moral standards of behaviour evolved by society and people inducing people to actions that are, in principle, socially useful and that may even run counter to man's biological needs.

We observe a completely different picture in the activity and relations of apes in their herds and in experimental groups. The apes' activity

and relations never go beyond the confines of a group, herd. The latter, as shown by studies, practically do not communicate with other herds or form a more general system. Hence the psyche of apes is restricted to the goals of the group to which they belong, and above all, to purely individual goals. For this reason the scale of existing relations among apes and the scale of relations among people are incomparable, as are the wealth, changeability of the content of the psyche of one and the other. It is essential to remember also that the relations of apes in herds and groups are totally determined by an hierarchical law of co-subordination with all the ensuing results: suppression of the initiative and behaviour of a subordinate individual or all herd members.

The narrow, group character of ape behaviour shaped the individual, biological nature of their relations, including in the experiments with tokens. The exchange of tokens usually took place only between the young or more or less equal individuals, or between individuals who were close friends. In most cases it could not have happened because a higher-ranking ape took away the tokens from the rest of the experimental group members, especially in case of a delay in the use of a token. Thus when chimpanzees were quartered by pairs and poker chips were thrown to them, and when the machines were opened five minutes later, in that short period the dominant individuals had taken away the chips from the weaker ones in all three pairs. In a pair of young females the subordinate Buela cajoled tokens from Bimba and not without success: of the 84 tokens in 13 series of ex-

periments she managed to acquire 46, whereas out of the 50 tokens the male Welt received not a single one from an elder male Moos.

A curious example, characterising relations between apes, was described by the Soviet researcher A. I. Schastny. An experimenter threw tokens into a cage containing the young male Bodo and female Lada, who occupied a dominant position in relation to him, in exchange for which the apes would receive some sweets. When Lada was present, Bodo did not dare to pick up tokens or sweets. Lada usually handed the experimenter five tokens and received a reward for each of them. Once in Bodo's presence five tokens were thrown into the cage, one of which the male surreptitiously hid in his mouth and sat there as if nothing had happened. Lada picked up the tokens one by one, handed them to the experimenter and received a sweet for each token. Having used four tokens for the purpose, she began searching for the fifth one. Lada painstakingly scanned the floor of the cage and felt the space just outside the cage. Puzzled, she went up to Bodo who was sitting there nonchalantly, raised his hind legs from the floor, then the fore limbs, chased him away from the spot, studied it carefully and again began poking around in the corners of the cage. After that Lada again went up to the motionlessly sitting Bodo, issuing the "contact" sound. Usually in such cases Bodo also issued sounds, but since he had the token in his mouth he, naturally, could not reply. This surprised Lada. She began studying him carefully, felt his face, lips, opened his mouth, saw the token, removed it from his mouth and ... cuffed the culprit. Having performed the

"act of retribution", she calmly went up to the experimenter, proffered the token and received a sweet.

These experiments demonstrated the great possibilities of improving ape psyche, which is expressed in a substantial enrichment of their memory, experience, ability to generalise and classify various objects, creatively to use the acquired knowledge in new situations and in solving even more complex problems. At the same time the experiments firmly convinced most scientists of the qualitative difference between the psyche of anthropoids and human consciousness and of the anthropoids' lack of the latter in even an embryonic form. Since human consciousness is inseparably linked with sound speech, an essentially social language, specialists decided to attempt to teach it to chimpanzees and gorillas. And since language is best learned in childhood in domestic surroundings, experimenters began taking new-born or very young apes into their families, where the process of their education and learning human speech took place.

A pioneer in this sphere was the Soviet researcher N. N. Ladygina-Kots, who already during the First World War brought up in her family the chimpanzee Ioni and painstakingly studied his mental development (true, without specially teaching him human speech).

Ioni lived in the family from the age of one and a half years and was under observation for over two years. He was a very bright, active creature, demanding constant attention. Ladygina-Kots stressed that with respect to adaptability to life, solving practical problems Ioni was much superior to her son Rudik, who was also 18

A chimpanzee expresses satisfaction

months old. Unlike Rudik, Ioni healed himself, licking wounds, pulling out splinters, endured pain without a whimper. But beginning with the age of three years the situation changed radically. As Rudik learned to speak he increasingly surpassed Ioni in mental development and in solving practical problems. Whereas Ioni, the same as other anthropoids, while correctly reacting to many of the teacher's words, did not understand their human meaning, and hence his behaviour remained purely animal in nature.

Of great interest is the experiment in the prolonged education and training of a new-born female — chimpanzee Vicki — by the American couple Hayes, both psychologists. Taking Vicki into their family, the Hayes intended to approximate the ape as much as possible to the human way of life and speech communication, showing concern and love for the chimpanzee, giving her every opportunity for development in the human way. Vicki literally took the place of a real child for the young couple. She lived together with the "parents", ate at table with them, took part in all family events, and never left "mama" Cathy's side. Despite the couple's heroic efforts to educate Vicki, from the first days of her life in the family her behaviour differed from the behaviour of a child of the same age (and the difference increased with time). When a child of the same age was brought to play with nine-month-old Vicki, in response to its attempt to touch her or take some of her toys the chimpanzee immediately pulled them under herself and then began hitting and biting the boy. Whereas the nine-month-old baby was able to sit alone for a while, constantly babbling to itself, Vicki

demanded undivided attention, making no attempt to express anything with the aid of sounds. Under the Hayes' guidance Vicki learned to solve various problems, to make use of household appliances and other objects, displayed shrewdness and cunning in games, i. e., developed her psyche considerably.

However the scientists were fully aware that the further humanisation of the ape was impossible without her learning human speech. That is why they concentrated on teaching Vicki to speak. The result was very modest indeed. With great difficulty the chimpanzee learned to pronounce the word "mama", then the words "papa" and "cup", without, however, giving them any definite significance and using them differently in different situations. That is, for Vicki these words were in principle identical with the ordinary sound signals of apes. During the experiment it was ascertained that, with respect to the complexity of her behaviour and ability to solve practical problems, Vicki (like all the apes in the experiment) had risen to the mental development level of a three-year-old child, whereas in the sense of mastering human speech she could be compared to a one-year-old child. Similar results were recorded in experiments in the education and speech training of other anthropoids.

The prominent Soviet psychologist L. S. Vygotsky, discussing in the 1930s the experiments of US psychobiologist Robert Mearns Yerkes in teaching a chimpanzee sound language and analysing the causes of their failure, proposed substituting it by the language of gestures used by the deaf and dumb. The greatest success in this

was achieved by the American psychologist couple Allen and Beatrice Gardner, who used the sign language of the American deaf and dumb — *Ameslan.* The latter was formed and exists on the basis of ordinary English and therefore includes hand signs that denote letters, form-words, etc. In the composition of this sign language there are also *iconic* symbols, i. e., symbols that bear a similarity to the objects and actions described by them. It is these that represented most of the gesture-signs of all apes that were taught this language.

§ 3. Development of Chimpanzee Psyche by Means of Language

Before expounding on the essence of the Gardners' experiments, it is necessary to touch at least briefly on the new features of anthropoid psyche, which appear in the process of communication with people. This will help better to understand the initial basis of the Gardners' experiments and the results they arrived at.

The Gardners chose the eleven-month-old female chimpanzee Washoe as the object of their upbringing and training. Like all chimpanzees, she possessed a quite well-developed brain, an articulated hand capable of diverse actions, normally developed sense organs, was distinguished by constant mental activity, a willingness and striving to communicate in the most diverse ways, a developed curiosity, ability to imitate actions, etc. Obviously these typical features of Washoe's bodily structure and psyche served as an excellent base for teaching her the language of gestures, which specifically required the ability

to imitate the actions of others, steadfast attention, flexibility of the hand and fingers, etc. The method of teaching the language of gestures is, undoubtedly, in every respect preferable to the method of teaching apes a sound language, for neither the structure of their organs of speech, nor the structure of their brain is adapted to learning and pronouncing words or their combinations in phrases.

Like their predecessors in such experiments, the Gardners introduced Washoe into their family, surrounding her with care and love, provided her with a multitude of diverse toys, gave her different kinds of pictures and illustrated books. She had an opportunity constantly to look at and play with them, to draw and to use diverse household objects. She lived in a big room with suitable furniture and daily went on long walks with her adopted "parents". In short, the Gardners created optimum conditions for the all-round development of the chimpanzee's intellectual and linguistic potentialities.

Washoe's successes in learning Ameslan surpassed all expectations. In five years (from 1966 to 1971) she learned 160 words and actively used them in communication with people.

How did the process of learning proceed? Relying on the above-mentioned abilities of apes, the Gardners first taught her *iconic signs*.[1] Proceeding from the method of *moulding*, they

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[1] See: R. A. Gardner, B. T. Gardner, "Comparative Psychology and Language Acquisition", *Annals of N. Y. Acad. Science*, ed. by K. Salzinger and F. Denmark, 1977, pp. 1-77; R. A. Gardner, B. T. Gardner, "Early Signs of Language in Child and Chimpanzee", *Science*, Vol. 187, No. 4178, New York, 28 February 1975, pp. 752-753.

showed Washoe some object, for instance a hat, and patted the top of the chimpanzee's head with her own hand. With the passage of time when Washoe was shown a hat she herself already patted her head. Finally, she made the gesture on her own initiative, demanding the hat before going for a walk. In this way Washoe learned a whole series of signs like "toothbrush", "food", "flower", "dog", "cat", "shoes", "trousers", "clothing" etc. It should be noted that among the signs learned by Washoe there were sign-gestures that signified groups of objects, which appear similar to apes regarding their functions and appearance. Incidentally, the capacity for the generalisation and classification of external phenomena is inherent in all higher animals. Without it they would be unable to orientate themselves so well in their environment or act in a purposeful way. Washoe was only able to develop this capacity both as to content and in the sense of specially designating by gestures her *sensorially generalised images* and actively to use them.

Similarly, Washoe learned the active use of such *non-iconic* signs (i. e., which have no similarity with objects or phenomena) as "some more" (joins the tips of her fingers, usually above her head), "hurry" (shakes her open hand), "funny" (presses the end of her first finger to her nose, snorts), "I", "to me", "me" (points or touches her chest with her first finger), "hurts" (sharply brings together the tips of first fingers, repeating the movement several times), etc.

The development of Washoe's psyche in these experiments was also expressed in the generalisation of the signs themselves, extending it to other objects and situations. Thus, initially the

sign "open" addressed to the experimenter meant her request to open the lid of the box with toys. Washoe soon learned to use this sign on her own initiative, for the opening of a door or as a request to open a faucet to get a drink, etc.

At the age of eighteen months Washoe began joining gestures into meaningful phrases, consisting first of two, and later of three or more gestures: "come open", "open blanket", "dog bite" (in the sense of fearing it), "you tickle I", "You I let out" etc. Washoe began on her own initiative to combine gestures to signify objects that were new to her. Thus, on seeing swimming swans, she signified them by the gestures "water birds".

When the Gardners analysed the order of words in 158 two- and three-word "utterances" of Washoe's at the age of three years, they found that the majority of them were constructed on a principle similar to that of words in phrases of a two-year-old child. In 105 cases Washoe put in her own name, and also the pronoun "I", which with her signified "to me", "me" in the second place after the name of her interlocutor, thereby assessing herself as the object of the action: "You tickle Washoe", "You I walk", etc. In the Gardners' opinion, Washoe was able to distinguish the phrases "You tickle I" and "I tickle you". If we add to the above that at five years of age Washoe replied correctly to 12 types of questions, including the questions "who?", "where?", "whose?" "what?", in 85 per cent of the cases, it becomes clear how much her psychic development had progressed toward consciousness. The Gardners drew the conclusion that by the level of learning a language Washoe

was no inferior to a two-year-old child. And in as far as a language, even in the form of gestures, is inseparably linked with consciousness, so, the Gardners believe, Washoe possessed the embryo of consciousness of a two-year-old child. It is in this sense that they interpret, for instance, Washoe's classification of pictures of people and animals into two groups, numbering herself among people, while regarding other chimpanzees as animals.

Similar experiments with other anthropoids confirm the fact that these results were not a chance occurrence. Interesting in this respect are the experiments of Jane and Maury Temerlin, scientific workers at the California Institute of Primate Studies, who educated and trained the chimpanzee Lucy for several years from the moment of her birth. The results of educating and training Lucy were even more instructive, apparently because she was taught the language of gestures from her birth and taking account of similar experiments with Washoe and other apes. In the teachers' opinion, Lucy not only generalised signs and classified objects with their aid, not only correctly composed sentences out of signs, but distinguished their order in three-part sentences. She, for example, indicated different wishes in the expressions "Roger tickle Lucy" and "Lucy tickle Roger", which in the opinion of linguists is a sign of her having learned elementary rules of English grammar. Lucy actively used, to even a greater extent than Washoe, her knowledge of the language of gestures for communication with people, for playing with them. Thus, she delighted in repeating on her own initiative the game of hiding spectacles

The gorilla, a modern anthropoid ape

or taking teacher Roger Fouts' watch from him and returning it only after he had named it by a corresponding gesture. In Fouts' opinion, Lucy "like the child ... talks to herself, plays with words..."[1], improving thereby her mastery of the language of gestures. As a result of such improvement Lucy was able constantly to express in the language of gestures her condition and emotions: "I cry" (on the teacher's leaving), "dirty tomcat" (about a stray tomcat), "it hurts", "hurt" (about a sick kitten), etc. The American psychologist Eugene Linden even presumes that Lucy "was also bending words to suit her feelings ... she was telling us what she thought..." (!)[2]

There are considerably fewer gorillas in the world than chimpanzees. So naturally few experiments were conducted with them. However, recently gorillas are also being taught languages and, as it turned out, no less successfully. F. Peterson, a University of California student, after attending a course of the Gardners' lectures, began teaching a one-year-old female gorilla Koko the language of gestures. In approximately the same time as it took to teach Washoe, the gorilla learned 650 (!) sign-gestures, and actively used 375 of them. Like Washoe, she herself began composing combinations of gestures and with their aid successfully communicated with people, expressing her feelings, wishes, and intentions. After Koko had surpassed the chimpanzee in mastering the language of gestures, F. Pe-

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[1] Eugene Linden, *Apes, Man, and Language*, Saturday Review Press/E. P. Dutton & Co., Inc., New York, 1962, p. 97.

[2] *Ibid.*, p. 114.

terson began teaching her English. The result was quite impressive: the gorilla learned to understand the meaning of hundreds of words and to use several dozen of them in communication with people.

Some researchers have attempted to teach apes different sign systems. Thus, the American scientists Ann and David Premack conducted experiments with the chimpanzee Sarah with the aid of a set of coloured plastic figurines, which were attached by magnet to a special board; the plastic figurines — signs of various objects, primarily ordinary ones — bore no similarity to them, any more than to the subjects of action (by Sarah and other experimenters or chimpanzees). The basic tasks of teaching consisted in the chimpanzees learning the signs of objects, their properties, forms and colours, and the signs for the names of groups of objects, their relationship, including causal relationships of the type "if X, than Y". In the course of experiments Sarah was taught to compose simple, compound and complex sentences.

By way of illustration we cite several examples of teaching a chimpanzee. Sarah is sitting at a table, next to which stands a vertical magnetic board. A banana is placed before the chimpanzee, which she gladly picks up and eats. In the following experiment the banana is moved aside and substituted by a plastic sign of a definite form. In order to receive a banana, Sarah must pick up the sign and place it on the "language board", which she eventually manages to do. In a similar way she learned the meaning (biological!) of many other everyday objects: cups, spoons, balls, etc. After which the chimpanzee

was taught before receiving an award to compose on the board first simple, and then more complex phrases, for example: "Apple, red, round", "Give, Sarah, banana", etc. Sarah also learned to generalise similar objects by their shape or colour and correspondingly expressed this relation, placing the sign "the same" between identical objects and the sign "different"— between others. At a later stage, with the aid of signs Sarah began confidently naming groups of identical objects, replying to questions concerning the properties and relations of objects, and making a selection between two types of phrases which contained, among others, such abstract word-signs as "if" and "if not". The first of these phrases was composed as follows: "If Sarah take apple, Mary give chocolate Sarah", the second —"If Sarah take banana, then Mary not give Sarah chocolate", and Sarah put the figure "if — then" in a definite place in the phrase.

Summing up the results of the experiments, Ann Premack wrote that Sarah first learned the meaning of relation between spoons and cups. After this she began composing sentences on a board, learned to understand relations between words in simple sentences and, finally, that there exist relations between simple sentences. She was able on this basis to learn complex sentences and, finally, came to understand relations of dependence in compound sentences.

C. Assessment of the Results of Experiments

How to assess the results of experiments in teaching anthropoids to perform complex actions with the aid of tools, and especially to learn Ameslan and sign systems? The experimenters

themselves, as a rule, draw from them the conclusion that the experimental apes had acquired the rudiments of consciousness and human speech, as expressed by the apes' creative use of Ameslan and signs for communication with people and among themselves, by their learning symbols, with the aid of which they classify objects, distinguish themselves from the environment, etc. The American psychologist Linden cited above even presumes that the results of these experiments possess an ideological significance in the sense of overcoming the old paradigm of thinking which counterposes people to the animal world and engenders all the misfortunes of present-day human society. He holds "that Washoe both fits into a recurrent pattern of scientific change and, at the same time, that she heralds a revolution significantly broader than one within any particular scientific discipline",[1] creating possibilities for the solution of humanity's global problems.

However, the majority of scientists do not see fundamental changes in the experimental apes as a result of their learning Ameslan and take a more sober view of the results of these experiments. In particular, we cannot agree with Linden's assessment of individual discoveries as having a revolutionary effect on human history. Naturally, this or that discovery in science is important for the development of humanity. But the course of the latter is by no means determined by individual achievements in science (no matter how brilliant they may be), but by the entire scientific and technological progress together with the ensuing transformation of social produc-

[1] Eugene Linden, *Op. cit.*, p. 223.

tion and material relations between people. In this case mankind's realisation of its kinship with apes, which Eugene Linden calls for and in which he sees the decisive significance of the experiments with Washoe, will hardly change man's life, or lead to the solution of ecological, demographic and other global problems of present-day society.

Let us examine the results of the experiments in teaching Washoe and other anthropoids the language of gestures from the viewpoint of the above theoretical premises, i. e., from the positions of the teaching of I. P. Pavlov and his followers on conditioned reflexes, the essence of implemental and communicative acts of behaviour.

First of all we note the authenticity of the experimenters' results, for they were received in a great number of experiments with different individuals belonging to the same species. We also stress their vast importance in revealing the nature of the psyche of anthropoids, its similarity to human consciousness, the possibilities of its development toward the latter.

Undoubtedly, teaching apes diverse manipulations with different kinds of household appliances and apparatuses with the purpose of enabling them to jointly obtain food, toys, etc., had a great progressive influence on the psyche of the apes. Obviously, in performing these complex actions with tools the apes acquired a great many notions about the objects surrounding them, especially the ones used in the course of experiments. On the other hand, solution of different problems by the experimental apes in finding food, opening locks, etc., facilitated the development of their

thinking, including in cooperative actions. We can recall Wolf's experiments, in which the apes together turned a heavy flywheel, used tokens and automatic dispensers to acquire objects, food, etc. Quite obviously the experimental apes possessed a great deal more knowledge and behavioural experience, were more quick-witted in solving practical problems than their kin or even they themselves before the experiments. In this aspect they serve as a good model for analysing the implemental activity of man's immediate ancestors.

At the same time it should be stressed that no matter how complex the apes' acts of behaviour may have been in experimental conditions, they retained their biological nature, for these acts were performed under the influence of biological needs and for their satisfaction. The psychic side of the apes' acts of behaviour — motives of actions, goals, sensory images — underwent no qualitative transformations.

Better results were obtained in the experiments of introducing young apes into a human family and teaching them Ameslan and sign systems. Indeed, the placing of apes in a completely new social situation and their mastery of the rudiments of the human sign language were bound to bring their psyche much closer to human consciousness in the sense of its sharp intensification, active use of language for setting and achieving goals, development of attention, emotions, etc. Let us examine the above data in greater detail.

Specialists agree that in the experiments in developing ape psyche a special place is occupied by their mastery of the language of the deaf and sign systems. This is understandable, for Ameslan,

for instance, is a real human language, which includes the sum total of word-elements of 37 *cheremes*, i. e., basic gestures, which signify objects and notions, and also special rules for joining them in sentences. One can readily see the fundamental difference, in complexity and in structure, between Ameslan and a primitive collection of random combinations of gestures used by apes in their communication with one another.

Learning even the rudiments of Ameslan and primitive sign systems determined, as we see, the complexification and increasing diversity of the experimental apes' acts of communication with people and among themselves, their striving independently to compose phrases from the gestures and signs they had learned, to invent new gestures, etc. All this, undoubtedly, signified that their psychic activity had grown more complex and had acquired new characteristics, which researchers find so astonishing.

In the course of the experiments the apes' psyche acquired new traits, as manifested by the fact that in the process of experiments their sensory images of objects and actions with them, i. e., notions of them, were combined with definite gestures or signs — figures, tokens, etc. (To wit the experiment with Sarah, who was capable of identifying a certain figure with a banana even in the absence of the latter and, after performing definite actions with the figure-sign, received a treat. Similarly Washoe united in her mind the image of a hat with a definite gesture — patting the top of her head — and on performing the gesture, received it before going out for a walk.) This comprehension of the meaning

of gestures and signs provided the apes with great advantages in achieving their individual goals, for it enabled them to reproduce the images of objects in their absence, readily to use them, express their intention with signs, etc.

The cited new peculiarities of the chimpanzee psyche affected primarily the development of their thinking. Whereas in ordinary conditions apes think with notions closely associated with objects and actions with them, experimental apes think already with the aid of signs or gestures signifying corresponding objects and actions, i. e., think in their absence, without contact with them, and without influencing them with their working organs. In other words, there emerges in them *sign thinking* in anticipation of implemental actions. With its aid Washoe and other apes found it easier to operate with the images of objects and actions with them, transforming them into diverse goals, and were to a certain extent freed of the fettering influence of circumstances, were better able to orientate themselves in the environment. Sign thinking helped them more successfully to generalise and classify objects. Thus Washoe and Lucy laid out separately the photographs of animals and people. It was the designation of the external attributes of animals and man with the aid of corresponding signs and gestures, which they had mastered in the process of instruction, that determined the success of the apes' actions, as well as Sarah's actions in classifying cups, spoons and other objects by their form and colour.

Mastery of the tangible meaning of signs and gestures facilitated their active use by apes for the satisfaction of their needs in food, play,

curiosity, and communication, including through the spontaneous composition by them of compound and complex phrase-sentences. This was also the reason why the apes distinguished themselves from their environment to a much greater extent than is usually the case in ordinary conditions. Washoe, for example, easily recognised herself in a mirror, placing her own photo in the stack of photographs of people and the photo of her hairy father — in the stack of animal photographs.

Finally, the knowledge of the tangible meaning of signs and gestures also influenced the manifestation of emotions in the experimental apes. As we have seen, Lucy expressed her emotions by gestures both with respect to herself and with respect to surrounding creatures and objects. As in the case of sign thinking, sign emotions are addressed to someone or something, they are related to concrete environmental phenomena, whereas the emotions of apes in their natural habitats are not addressed to anyone in particular, for they express the subject's general condition.

Thus, the apes' proficiency in the system of gestures and signs served to bring their psyche closer to that of man, but to what extent?

We have seen that man's consciousness is a consequence of his being a member of society. The successes of experiments with Washoe and other apes in the development of their psyche specifically towards consciousness were explained by the fact that they were included in social systems and had acquired some knowledge of human language and acts of behaviour. However, it is precisely their incomplete inclusion in society

and acquisition of human language that is the chief reason of the fundamental distinction between the psyche of higher apes and human consciousness.

Present-day biology has proved beyond any doubt that each animal belongs to a species, whose specifics determine the behaviour of individual specimens and the common behaviour of representatives of a given species. In other words, an animal's inclusion in its own biological system already before its birth fully shapes its future behaviour, wherever it may live. This, of course, concerns us humans as well. We belong to the species of *Homo sapiens*, which determines many features of our behaviour — instincts, inclinations, emotions. People differ from all animals in that, in their time, they created a new social system and are continuously developing it. It is the latter that changed and continues to change our bodily structure and our behaviour, uninterruptedly transforming the latter into social, conscious behaviour.

The experimental apes that were included in society also learned human behaviour to a certain extent. Nevertheless they remained representatives of their species, their biological system, and hence remained animals in behaviour. Therefore, the apes' psyche also remained the psyche of animals.

As representatives of their species, chimpanzees and gorillas have a corresponding bodily structure, which differs from man's bodily structure in quality, above all with respect to the primitive structure of the organs of speech and also the volume and structure of the brain, which lacks the centre of sound speech, as a consequence of

which the apes are incapable of mastering it, and hence also consciousness.

It is the apes' imperfect bodily structure that explains their inadaptability to life in society and determines the preservation of the biological nature of their psyche even in the most favourable social conditions of existence. They are simply incapable of fully joining in the life of a human family, to say nothing of big social groups of people, or to understand their interests and goals. The behaviour of apes is wholly restricted to their own biological needs and, consequently, their psychic activity is shaped by and restricted to individual motives and goals, and acts of behaviour are subordinated to their current emotional condition. As in their own herds, apes continually seek to determine their place in groups of humans and to establish and actively uphold the most advantageous place in these groups. The attitude of apes to both their teachers and to strangers is subjective, egoistic, demanding constant attention, love.

Another related reason for the preservation of the biological nature of ape psyche in experiments on its development, consists in that Ameslan, as merely a surrogate of genuine human language, differs from it to a great extent. First, the vocabulary of Ameslan is much poorer than that of natural language. Second, unlike ordinary words, which are comprised of letters, the word-gestures of Ameslan cannot be divided into parts. Therefore they do not lend themselves to declension and conjugation, the formation of new words, hence the difficulty of expressing with their aid thoughts or ideas, particularly abstract ones. That is why, apart from

ordinary gestures, which are mainly iconic in character, the deaf and dumb use a so-called *finger code*, in which each letter of the ordinary alphabet corresponds to a definite configuration of the fingers to express a scientific notion or some complex experience. Hence, thirdly, also the primitive nature of the Ameslan grammar.

It should be borne in mind that the experimental apes learned only a small number of the most necessary gestures (or other signs) and the basic rules of joining them together. And, most importantly, for them signs and gestures had only a biological significance and were used for biological purposes. Suffice it to recall the combinations of Washoe's gestures with the aim of receiving tidbits, satisfaction from tickling, etc. Known is a case of a dog learning to type words on a typewriter with its nose so as to receive a corresponding tidbit.

The experimental apes learned the rudiments of Ameslan as a biologically important system of signs, and not as a human language, and consequently their psyche remained at the level of sensory images associated with signs, lacking even an elementary notion about the characteristics and associations of objects or phenomena.

It should be stressed that unlike the deaf and dumb, who, having learned a natural human language in the form of a finger code, can easily go beyond the confines of a language of gestures, experimental apes always remained slaves of the latter; their thinking is fettered by the actions of hands, it cannot be divorced from them or acquire a relatively independent significance, as in the case of people. Small wonder then that

many linguists express serious doubts about assessing the gesture communication of experimental apes as a language. Specifically, the prominent Soviet linguist B. V. Yakushin stresses that, unlike the deaf and dumb, who actually communicate in an ordinary, natural language, in which the sound form is merely replaced by the gesture, experimental apes communicate only by gestures. Hence one can hardly consider the "pure", unassociated with words language of gestures as a human language, and we must reply in the negative to the question about whether apes have learned a human language. The same conclusion is borne out by the data on the structure of the ape brain, in which no centre for sound speech, i. e., for the specifically human means of communication, has been discovered.

Proceeding from the above, we can draw the following conclusion. As a result of anthropoids' learning the gesture forms of communication, their psyche, undoubtedly, received an impetus for further development, showing at the same time its big potential for improvement. Already in the past century F. Engels, summing up the available scientific data, wrote: "We have in common with animals all activity of the understanding: *induction*, *deduction*, and hence also *abstraction* ... *analysis* of unknown objects (even the cracking of a nut is a beginning of analysis), *synthesis* (in animal tricks), and, as the union of both, *experiment* (in the case of new obstacles and unfamiliar situations)."[1]

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[1] Frederick Engels, *Dialectics of Nature*, Progress Publishers, Moscow, 1974, p. 222.

The specifics of the psychic activity of higher animals listed by Engels characterise in principle also the psyche of Washoe, Lucy, Sarah and other experimental anthropoids. Numerous experiments in the comparative study of the psyche of higher animals, apes and man fully confirm and concretise Engels' precept. They confirm also Engels' conclusion to the effect that the chief distinction between human consciousness and the psyche of all animals, including higher apes, consists in man's ability to operate with notions, i. e., in his possession of reason. Experimental apes, which were approximated to the maximum to human life, remained apes by the nature of their psyche precisely because, lacking a knowledge of human language, they had no notion of the objects they were using. Instead of notions, they developed sensory image-concepts of surrounding objects and actions with them, with the aid of which the apes were able quite successfully to communicate with people and especially with each other for the satisfaction of their rather limited and practically unchanging, biological needs. Further in this work it will be shown that with man a notion, abstract thinking appears only in the process of the formation of huge and complex social systems, the emergence of which was accompanied by the birth of human sound language.

Mastery by anthropoids of the gesture form of communication, realisation of the vast possibilities of developing their psyche merely serves to improve the latter, without taking it beyond the bounds of ape psyche. But how, in such a case, does this conclusion fit in with the firmly established fact that, as regards the solution of com-

plex practical problems, the behaviour of experimental apes is identical with the behaviour of a two-year-old child? Doesn't this fact attest to the identity of their psyche and, hence, of an embryonic consciousness in anthropoids? We presume that it merely characterises the external similarity of the behaviour of a child and the behaviour of apes without taking into account the crucial thing — the fundamental distinction of the nature of their psyche. Indeed, the psyche of a child from its birth and approximately to the age of two to three years is shaped by instinctive, inherited traits and the individually acquired experience of behaviour, which in principle is similar to the experience of behaviour of a chimpanzee of the same age. More, as many observations show, including those performed by the Soviet researcher N. N. Ladygina-Kots, the behavioural pattern of baby chimpanzees is richer, and with its help they adapt much better to a situation than a child of the same age.

But man's bodily structure, unlike that of a chimpanzee, especially the structure of the human brain and organs of speech, presuppose from the moment of birth his learning of coherent speech, and consequently, also notional thinking. That is why in learning to speak a child transforms his psyche, acquiring the rudiments of consciousness. Their practical role in his behaviour is still insignificant, wherefore there is an external similarity with the behaviour of experimental apes. However, whereas the psyche of the latter is at the height of its development, the rudiments of a child's conscious psyche are merely a prerequisite of his social development and, accordingly, the

beginning of the development of his future consciousness.

How can we characterise the psyche of anthropoids as a whole? Quite obviously, its level of development is the highest of all animals. It is determined by the apes' herd way of life, which greatly complicates the behaviour of individual apes and, consequently, also their psyche. In addition, it is determined also by the relative perfection of anthropoid bodily structure, particularly the structure of their brain, organs of sense, hands, etc. Undoubtedly such a development of the psyche of anthropoids and its kinship with human consciousness is important in revealing the natural character of the origin of the latter. Numerous experiments with the development of the implemental activity of the anthropoids and their learning of the gesture form of acts of communication have clearly shown the main directions which our distant ancestors must have followed in order to become human beings. They have also fully confirmed the possibility of such an evolution of man's animal ancestors (which will be dealt with below), revealing its concrete paths. First, man's ancestors were compelled continually to make their behaviour ever more complex in order to ensure their survival in constantly changing conditions of existence. Second, they were compelled to perfect their herd relations and means of communication as an important lever of perfecting their psyche in the direction of human consciousness. And finally, the experiments have once again demonstrated that the anthropoids' bodily structure is imperfect enough to limit the development of their psyche, and, consequently, they have proved the

necessity of developing the latter as an important prerequisite for the genesis of consciousness. The above-listed basic directions of the evolution of higher animals in the direction of society can serve as the basis for an analysis of numerous facts describing the mode of life of man's direct ancestors.

CHAPTER THREE

THE LIFE AND PSYCHE OF MAN'S DIRECT ANCESTORS

Scholars have long pondered the questions of the origin of man, whom to consider the ancestors of men, what were the basic features of their ape-like ancestors — bodily structure, psyche, means of communication or something else besides — which played a decisive role in turning them into human beings; how much must these ancestors have differed from all other animals and first of all from the higher apes; to what extent must they have resembled people and in what way; finally, where did they live and when?

A substantial contribution to the solution of all these problems was made by the great English naturalist Charles Darwin. In the work "The Origin of Species by Means of Natural Selection", published in 1859, and later in the work "Descent of Man and Selection in Relation to Sex" (1871) he irrefutably proved man's natural appearance from the animal world under the influence of the latter's laws and above all the operation of the law of natural selection. Darwin comprehensively substantiated what is known as the simian theory of the origin of human beings, which traces their origin to a hypothetical species of higher apes of the *Ter-*

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tiary period,[1] which, in his opinion, had lived in Africa, and where the ancestors of the present-day chimpanzees and gorillas lived. An enormous contribution to the substantiation of this theory was made by Darwin's followers Thomas Huxley and Ernst Haeckel. Huxley concretised the similarity of man's bodily structure with the bodily structure of the gorillas and chimpanzees, which in this respect are much closer to man than to the lower apes. Haeckel corroborated Darwin's simian theory by revealing the deep-going similarity of man's embryonic development with the main stages of the development of the organic world, beginning with the unicellular and ending with complex organisms.

However, the works of Charles Darwin and his followers constituted only the first stage in solving the problem of the genesis of man. The opponents of the simian theory posed new questions to its authors: what forced the apes to come down from the trees and take the road of humanisation? What is the mechanism of the latter? If the process took place gradually, what stages did it include, and how long did it take? Finally, are any real facts available that bear out this theory of man's origin?

Darwin attempted to explain man's origin by the operation of the law of natural selection. But this did not explain the appearance of such a huge brain in man, his consciousness, moral

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[1] A period of the geological history of the earth (beginning about 70 million years ago), which preceded the epoch of the appearance of man. Towards its end (over five million years ago) there appeared the first australopithecines, which existed until the beginning of the following (Quaternary) epoch.

and other qualities. Such a viewpoint obscured the qualitative difference of the human brain from the brain of the ape. Not surprisingly, Darwin's associate Alfred Wallace, who simultaneously with him created, on the basis of his own studies of flora and fauna, a theory of natural selection, sharply contradicted Darwin's theory on the origin of man. In Wallace's opinion, the operation of the law of natural selection was essentially incapable of resulting in the appearance of anything useless, to say nothing of anything harmful for the organism, and therefore such a purely human peculiarity of bodily structure as hairless skin, support type of foot, huge brain, etc., could not have been the result of its influence. Hence Wallace drew the conclusion of the divine nature of man's origin.

However, the Darwinian theory on the origin of man, despite its weaknesses, increasingly attracted the attention of scholars, thereby giving an impulse to its own development and factual substantiation. Darwin's follower Haeckel expressed the bold assumption that there must once have existed a transitional, intermediate type of creature, combining the peculiarities of the bodily structure of man and the anthropoids, which he therefore called *Pithecanthropus* (from the Greek *pithēkos* — ape and *anthrōpos* — man).

This bold hypothesis attracted many scholars of the time. One of them was the young Dutch anthropologist Eugene Dubois, who in 1888 set out in search of the Pithecanthropus to the island of Java. And luck was with the young scholar. Already in 1890 Dubois discovered the remains of two skulls, and in 1891-92 — the top of a skull, a hip bone and teeth, which bore

the characteristics of Pithecanthropus given by Haeckel. It turned out that the volume of Pithecanthropus' cranium (approximately 900 cm^3) was substantially larger than the cranium of gorillas and chimpanzees and, consequently, occupied an intermediate position between the brain volume of higher apes and the brain volume of man, which averages 1,450 cm^3. The structure of Pithecanthropus' brain and his hip bone confirmed the fact that he walked basically on his two feet.

The triumph of Darwin's simian theory was soon corroborated by the finding in Java of the remains of three types of Pithecanthropus, all of which approached man's bodily structure to a different degree. In the 1920s discovered in China were the remains of a transitional being, which was even closer to man than Pithecanthropus — *Sinanthropus* (New Latin — *Sina* — China and Greek — *anthrōpos—man*). The finding of the intermediate creatures between man and the ancient apes, seemingly, proved the main thing — the natural origin of man. However science never stops at what has been achieved. Also, the opponents of the Darwinian theory of the origin of man advanced ever new arguments against it. The basic one was approximately the following: "Yes, man's body was formed in a natural way from the body of an ape, but this does not explain the appearance of the crucial thing in human beings — their consciousness, speech." And the argument is justified, for, as will be shown below, man's essence cannot be explained by the structure of his brain, organs of speech, etc., and his genesis — by the fact of the formation of man's bodily organisation. Small

wonder then that present-day theologists, using this difficulty of science, seek to explain the origin of man in a supernatural way. Thus, the prominent French paleontologist, philosopher and theologist Pierre Teilhard de Chardin, relying on extensive factual material, attempted to substantiate the idea of man's appearance as a result of the progress of the internal, psychic side of nature itself, which, in his opinion, is the basis of its evolution. Chardin was interested in only one aspect of primate development — the appearance of the human brain, and hence, also consciousness as the consequence of the development of an ideal substance: "What makes the primates so interesting and important to biology is, in the first place, that they represent a phylum of *pure and direct cerebralisation*."[1]

Apart from the main difficulty, there were also other snags in the above-mentioned simian theory. If the genesis of man cannot be explained by purely biological factors, then, consequently, some other material factors must be found confirming the source of man's origin. Thus there appeared the problem of the predecessors of the Pithecanthropus, i. e., the question of the *missing link* in the genesis of man, as well as the questions of the descendants of Pithecanthropus and Sinanthropus, which have not yet become people. The question of the place and time of man's origin, etc., remained to be explained.

A clear-cut and comprehensive answer to these questions was given in the late nineteenth century by Engels in the article "The Part Played by

[1] Teilhard de Chardin, *The Phenomenon of Man*, Harper Torchbooks, New York, 1959, p. 159.

Labour in the Transition from Ape to Man". Man, according to Engels, did not appear by himself, as a simple result of the action of biological factors, but only as the result of the appearance of society with its social character of production and labour.

The complexity of phenomena such as society and man predetermined also the complex character of the prerequisites of their appearance. As such a prerequisite Engels noted the transition of the ancestors of ape-man into an erect walking being, as a result of which their hand increasingly turned into an organ of labour: "...*The hand had become free* and could henceforth attain ever greater dexterity; the greater flexibility, thus acquired was ... increased from generation to generation."[1] An important consequence of this evolution was the beginning of the production of the first instruments of labour, and together with it also the emergence of acts of labour. Engels attributed great importance to the development of gregariousness in the ancestors of man. They, in Engels' words, "were gregarious; it is obviously impossible to seek the derivation of man, the most social of all animals, from non-gregarious immediate ancestors."[2] This species of ape, Engels further noted, in connection with the complex bodily structure and herd mode of life "far surpassed all others in intelligence and adaptability..."[3], which also facilitated the appearance of human beings with their consciousness.

It was this whole complex of prerequisites

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[1] Frederick Engels, *Dialectics of Nature*, pp. 171-72.
[2] *Ibid.*, pp. 172-73.
[3] *Ibid.*, p. 175.

that determined, according to Engels, the possibility of the appearance of social labour and social relations, and together with them also human speech and consciousness. Such an understanding of the mechanism of the derivation of man enabled Engels to clearly define the causes of this process, which Darwin and other scholars were unable to determine: "First labour, after it and then with it speech — these were the two most essential stimuli under the influence of which the brain of the ape gradually changed into that of man, which for all its similarity is far larger and more perfect."[1] It was also these two main stimuli that, according to Engels, determined the development of the organs of sense and speech. And all of them together determined the development of consciousness, the "power of abstraction and of conclusion".[2]

Such is the essence of Engels' scientifically substantiated labour theory of the derivation of man, which we shall be guided by in the further analysis of contemporary factual material concerning the given problem.

It is essential first to ascertain the difference between the immediate ancestors of man and ordinary present-day anthropoids, including the level of development of their means of communication and psyche, and to examine their life and psyche from the standpoint of the possibility of these apes being transformed into the first human beings. This dual approach to the analysis of factual material characterising the animal ancestors of man makes it possible to

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[1] *Ibid.*, p. 174.
[2] *Ibidem.*

answer a series of questions that have long been under discussion by scholars, as mentioned above, in particular the question of the *missing link.*

§ 1. Contemporary Science on the Life and Psyche of Man's Ancestors

Until quite recently the majority of scholars presumed that man's ancestors derived from the early *Rama-* and *Kenyapithecus* anthropoids (preserved of them are only a few fragments of jawbone and teeth), which came down from the trees as a result of the thinning of forests due to a drop in temperatures, and gradually evolutionised into the ancestors of man. However the most recent studies of the remains of Rama- and Kenyapithecus have compelled us to modify such an assessment of their evolution. It appears that they belong to a line of orangoutangs, and not chimpanzees and gorillas and therefore cannot be the ancestors of either them or us.

On the other hand, over the past 10 to 15 years important data have been received for the solution of the problem of man's derivation concerning the very close biological relation to man of contemporary chimpanzees and gorillas. The American scholars V. Sarich and A. Wilson, as well as scholars from other countries, including the Soviet biologist B. M. Mednikov, have definitely established an almost complete identity of human protein and the protein of the chimpanzee and gorilla, and hence, a similar identity of their DNA. The difference in the genotype of man and these apes comprises a mere 1.1 per

cent, which signifies their belonging to the same species of animal as man. All this bears out the fact that man and chimpanzees and gorillas derived from a biologically closely related ape that lived, as Darwin had presumed, in Africa.

Further studies showed that the rate of the change of proteins and DNA under the influence of mutation (i. e., changes in the hereditary material of an organism.— *Ed.*) is practically identical in all higher animals. With the aid of this "molecular clock" scholars established that the migration of apes from the Old to the New World took place some 36 million years ago, and the division of the ancestral Tertiary apes into a line leading to man and another line leading to the contemporary African anthropoids, must have taken place only four or five million years ago, which runs counter to numerous archeological and anthropological data, on the basis of which some specialists put the latter event back by seven or eight million years.

However, in the final analysis, it is not a matter of temporal differences, but the very fact of the chimpanzees' and gorillas' extraordinary biological propinquity to man. This propinquity, in the opinion of Vincent Sarich, John Desmond Clark and others, makes it possible to transfer, with a high degree of probability, scientific data on the bodily structure, individual and herd behaviour of the chimpanzee and gorilla to the bodily structure, behaviour and psyche of man's immediate ancestors. Thus Clark considers that "...if the separation took place as recently ... then chimpanzee and gorilla behaviour is especially relevant to understand-

ing that of the earliest hominids"[1], as well as the bodily organisation and implemental activity of the former may be a serious factor in recreating the behaviour of man's immediate ancestors. Therefore we shall make full use of the materials contained in Chapter Two.

Who was man's immediate ancestor? The South African anthropologist Raymond Dart made a big contribution to the solution of this problem. In 1924 he discovered in the eastern part of the Kalahari Desert (Southern Africa) a child's skull resembling both that of man and of an ape, and a massive lower jaw with teeth that closely resembled the teeth of man. In Dart's opinion, the creature, which he called Australopithecus (southern ape), represented an extinct species of large apes, intermediate between man and ape. However other scholars initially disagreed with Dart's conclusion. A continued search led to big successes: discovered in different parts of Southern Africa were a great many fossils of australopithecines of different species. Other discoveries were also made, which characterise their way of life. After World War Two (1939-45) discovered in the Olduvai Gorge (Tanzania) and elsewhere in Eastern Africa were fossil remains of australopithecines and numerous traces of their life. Beginning approximately 5.5 million years ago, australopithecines inhabited this part of Africa over a period of several million

[1] J. Desmond Clark, *The Prehistory of Africa*, the Camelot Press Ltd., London, 1970, p. 64.

Hominids — a family of primates. Includes modern man and the fossil remains of people: Pithecanthropus, Neanderthals and probably some fossils of the higher primates like the Australopithecines.— *Ed.*

years. The fact that the australopithecines from Southern Africa were much younger than those from Eastern Africa, and also some other signs led scholars to the conclusion that the former were the descendants of the latter, who later moved to other regions. They assess the australopithecines from Eastern Asia and Asia Minor in the same way.

Since the original habitat of the australopithecines was a large region of Eastern Africa (Tanzania, Kenya, Uganda, Ethiopia), we shall first examine the typical features of that region with respect to climate, landscape, geology, etc.

The region inhabited by the australopithecines was the medium high mountain range, with a deep fault dividing it in the meridional direction, causing frequent earthquakes and high radioactivity. The climate in these parts was warm in all seasons and adequately moist, for there were many lakes and rivers and frequent rainfall. The landscape was extremely diversified — tropical forests and savannas, mountain woods and alpine meadows — and the climate favoured the development of a varied animal and vegetable world. Yet the region was not an ideal habitat for the australopithecines: great quantities of different kinds of beasts of prey, frequent heavy rainfall with floods, active volcanoes and earthquakes constantly threatened their life. Yet scholars consider this part of Africa on the whole favourable for the life of the australopithecines and their development in the direction of human beings, above all because of the diversity of their habitats (in the mountains and valleys, forests and savannas, etc.) compelled the australopithecines continually to

change their behaviour, and consequently, also their psyche.

The australopithecines' biological flourishment helped them to adapt themselves to the most diverse conditions of existence, and hence also in moving to other, less favourable habitats (for instance, to the arid regions of southern Africa), etc. In the opinion of scholars, some five to six million years ago the common ancestor of the ape, living in the above-mentioned region of Africa, differentiated into the modern chimpanzee and gorilla and into different forms of australopithecines, possessing some unique features, which will be dealt with below. In studying them, specialists single out two generalised forms — *massive* and *graceful*. The former were relatively large organisms: the males were approximately 150 cm in height and weighed 70 kg, while the largest of the graceful australopithecines were up to 140 cm tall and weighed 40 kg. The massive australopithecines had strong skull bones and jaws, and big teeth (evidence of the fact that theirs was mainly a vegetable diet). Most scholars consider this form of australopithecines a dead end: in time it died out. Henceforth by australopithecines we shall designate only the graceful form.

A. The Bodily Structure of Australopithecines and Anthropoids

Unlike all other higher animals, the australopithecines walked erect. This is borne out by the structure of their foot, which, like the foot of man, has an arched structure, and also by the structure of pelvic and hip bones, head position and other characteristics. The prominent

The australopithecines

Soviet anthropologist V. V. Bunak considers that "as a whole the skeleton of the australopithecines was adapted to erect walking, though less perfectly than the hominids: the australopithecines took shorter steps, their body swaying from side to side"[1]; they moved very slowly on the ground compared with the movement of animals.

Obviously, the transition to such an imperfect erect walking was a matter of necessity. Bunak and others explain the cause of the australopithecines' transition to such a method of locomotion by their omnivorousness, i. e., the use as food of both plants and small animals, and also by the conditions of their life in the savannas and steppes, the need to expand their vision, especially in the savannas, the use of their front limbs for the procurement of food and for defence, etc. Unlike those of the chimpanzees and gorillas, the australopithecines' front limbs were noticeably shorter than their legs. Their hands were shorter than the limbs of fossil anthropoids and existing ones; they looked less like a hook and had a more developed thumb, already opposable to the other digits. This signified that the australopithecines' hand was capable of performing diverse delicate operations with different objects, including, obviously, also the kind that the hand of the chimpanzee and gorilla is incapable of performing. Consequently, the australopithecines' acts of behaviour were bound to be more

[1] V. V. Bunak, *The Species Homo, His Appearance and Subsequent Evolution*, Moscow, 1980, p. 14 (in Russian).

complex than those of modern apes, which in turn implies a more developed psyche.

A study of numerous australopithecine skull bones produced interesting results. First, it was ascertained that the volume of their brain was greater than that of modern anthropoids — equalling an average of 500 cm^3, while the brain volume of the chimpanzee and gorilla averages 400-450 cm^3. A greater brain volume, according to scientific data, implies also a more developed psyche. Second, the form of the australopithecines' skull is nearer to the shape of the human skull. The cranium arch is somewhat higher than that of the chimpanzee, the occipital bone stands out on the back wall, its frontal part is closer to that of man's, which indirectly bears out the progress of the australopithecines' mental faculties.[1]

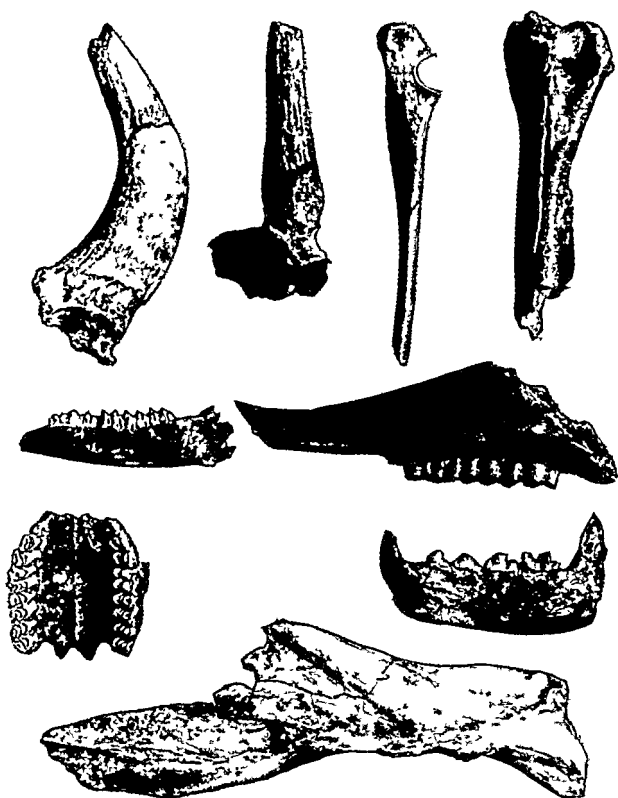
An all-round study of the australopithecines' bodily structure permitted drawing the substantiated conclusion that they represent the highest level of development of the animal world in the Tertiary period, and consequently, were distinguished by a more complex behaviour and psyche than the other species of that period. Indeed, erect walking, the ability of the hand to perform complex and delicate operations, the developed brain of the australopithecines helped transform the accidental implemental actions of their ancestor apes into a constant, multiform implemental activity, especially as there was no difficulty in finding handy objects for use as tools — sticks, bones, and stones

[1] See: Y. Y. Roginsky, *The Problems of Anthropogenesis*, Moscow, 1977 (in Russian).

of different sizes and shapes. The necessity for transition to such complex behaviour was determined also by the australopithecines' physical weakness, slow locomotion, lack of claws and powerful fangs. Since the development of the psyche is determined directly by progress in acts of behaviour, it is necessary to examine the specifics of their behaviour in order to elucidate the level of its development in the australopithecines.

B. The Implemental Activity of the Australopithecines

Science is convincingly proving that the use by animals of surrounding objects as instruments exists only in very few species and moreover it bears an instinctive, stereotype character, and remains practically undeveloped. Such is the use of cactus spikes by a variety of finches endemic to the Galapagos Islands to dig out insects from the bark of trees, the sea otters' breaking of oysters on their chests with the aid of stones, etc.

The australopithecines, as borne out by numerous facts, constantly used the objects around them as tools, with the aid of which they noticeably strengthened their natural organs (hands, fingers or feet), lengthened or substituted them, etc. Already Raymond Dart discovered a large number of the australopithecines' natural tools at their campsites. Thus, in the Makapan quarry he unearthed 7,159 fragments of bones, horns and teeth from approximately 433 different animals. Most of the discovered shoulder, large shin and hip bones were broken and showed

Bone tools of the australopithecines

signs of blows.[1] Also found during these excavations and in other places were stones of different size and weight. "There is a likelihood," wrote the Soviet archeologist S. A. Semyonov, "that the tubular bones and skulls of animals were deliberately broken for the extraction of marrow... However bones can be broken only with the aid of stones"[2]. Besides bones and stones the australopithecines also had to use sticks and clubs as tools.

The australopithecines' use of such hard, durable materials as bone and especially stone, determined the length of time during which they were used, and hence, also a certain differentiation in their form and purpose (among the great variety of the bone tools used by the australopithecines, Raymond Dart singled out several of the more or less typical ones), and also the possibility of their accumulation, which is confirmed not only by the vast amount of tools found at the australopithecines' sites, but also by the observation of present-day higher apes, which in experimental conditions occasionally show a tendency towards preserving the objects they use. The continual preservation and accumulation of versatile natural tools, which retained their properties and shape for long periods of time, largely shaped the vital activity of the australopithecines, imparting to

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[1] Raymond A. Dart, *The Osteodontokeratic Culture of Australopithecus Prometheus*, Transvaal Museum (Memoir No. 10), Pretoria, 1957.

[2] S. A. Semyonov, *Development of Technology in the Stone Age*, Leningrad, 1968, p. 129 (in Russian).

it new features and peculiarities typical solely of their way of life.

The australopithecines' concrete use of natural tools was, of course, determined by their primary biological needs — the need for food, security, reproduction, etc.

The australopithecines undoubtedly used tools to procure roots, bulbs and vegetation, as some apes do in natural conditions. However, there was not always enough of vegetative food in the savannas. Besides, meat was essential for normal metabolism, especially during intensive activity. That is why, J. Desmond Clark stresses, there took place "...an alteration in the dietary habits from a preliminary vegetation to an omnivorous diet in which meat eating acquired increasing importance."[1]

But how did the australopithecines procure meat? One can hardly agree with those authors who hold that the australopithecines ate primarily the meat of dead animals or what was left over after feasts of beasts of prey. First, there was the competition of jackals, hyenas and other small predators. Second, the australopithecines led a diurnal mode of life and hence were unable to interfere in the struggle for the remains of the predators' victims or dead animals. Finally, such a source of meat was very unreliable, purely accidental. Most specialists, on the basis of a careful study of facts, and above all the vast accumulations of bones discovered at the australopithecines' protracted campsites, have reached the conclusion that with the aid of clubs and stones groups of australopithe-

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[1] J. Desmond Clark, *Op. cit.*, p. 65.

cines systematically hunted various animals, as a rule small ones, but occasionally also quite big ones — deer, antelope, boars, etc. It will be recalled that wolves, hyenic dogs and other beasts of prey hunt together, with a definite division of actions — lay an ambush, steal up from different sides to a victim, drive in into ambush, etc. Apes act in a similar manner when attacking a plantation: by false manoeuvring they distract the attention of guards, and suddenly attack from the most vulnerable side. It is quite apparent that the slow-moving australopithecines, who were weaker physically, but more developed in the sense of bodily organisation, and armed with natural tools (which they used in the procurement of food) must have acted with even greater coordination, organisation, inventiveness and, hence, with great success.

Understandably, this type of systematic hunting presupposed in the australopithecines a more highly developed psyche than in other animals. This level of development must have manifested itself, first, in the australopithecines' good knowledge of the traits and habits of many more species of animals than are known to ordinary beasts of prey, which as a rule, hunt for a limited number of species. Without a firm grasp of such knowledge by the adult members of an australopithecine herd and without its constant passing on to one another and to their offspring, they would not have been successful in their hunting. Second, they must have clearly distinguished — wherein lies the chief difference between the psyche of the australopithecines and that of the other animals — the properties and form of the objects used in the hunt. They

also had to have an ability to use such objects quite skilfully, especially in extraordinary situations during cooperative hunting and defence. Third, the australopithecines were diurnal beasts of prey, which to a great extent hampered their actions in hunting, compelling them to resort to camouflage, invent new means of finding and killing their prey, to more complex cooperative actions, etc. Obviously, the aggregate of vital circumstances of the australopithecines' way of life determined a higher level of development of their knowledge, skills, cleverness in comparison with contemporary herbivorous apes. This natural general trend of development of the australopithecines' psyche is actually reproduced in the experiments described above, where anthropoids were taught to use different kinds of implemental activity and to coordinate them for the purposes of procuring food, play, etc. Hence, such experiments may be taken as a model of an extremely prolonged and complex natural process of the development of the psyche of higher animals.

The australopithecines were constantly compelled to act cooperatively with the aid of natural tools for yet another important need — the need to defend their prey, themselves and their offspring against lions, tigers and other predators, which also required a knowledge of the habits and traits of the latter, the ability to act in common against them and to expediently use handy objects against them. In addition, successful defence often produced the same result as hunting — procurement of meat for food.

The existence of defence in australopithecine herds is borne out by the following. Found

in caves in southern Africa, which had been inhabited by australopithecines, were 58 baboon skulls, approximately 50 of which were dented. The form of the dents coincides with that of the ends of a humerus of herbivorous animals, which was used as a club. Since these dents were located primarily in the front part of the skull, it may be assumed that the blows were dealt during a battle, in struggle.

It will readily be seen that defence, like hunting, also promoted the development of the australopithecines' psyche. It helped them to accumulate and diversify information on the environment, enhance skills in the use of natural tools, enrich the motives and goals of behavioural acts, strengthen individual ties, etc.

Hunting and defence are unthinkable without utilisation of the prey. Hence the latter can also be considered a constant type of the australopithecines' activity, which served to improve their psyche.

Primitive men's experience shows that they often failed to meet their need for food by hunting, and that the greater and, most important, regular part of their ration was comprised of vegetation. This is also true of the australopithecines. Lacking claws or other special organs adapted to facilitate the procurement of food, they were forced to look for suitable sticks, bones and stones, with which to dig up roots, etc. Primitive tribes known to us also often used natural tools for this purpose. The possibility of the australopithecines doing this on a permanent basis is borne out by observations of the way of life of anthropoids in both freedom and in experimental conditions.

Thus, modern science is convincingly proving that the australopithecines who lived several million years ago engaged in different kinds of systematic activity. "It is of course highly likely," writes the British archaeologist K. Oakley, a well-known authority on the australopithecines' way of life, "that pre-human hominids were semi-carnivorous and that they made use of stones, sticks and bones as ready-to-hand weapons and tools..."[1] The Soviet anthropologists V. P. Yakimov, Y. Y. Roginsky and others arrived at a similar conclusion on the basis of later and fuller materials. The appearance in the australopithecines of a comparatively complex bodily organisation and the multiform, systematic implemental activity linked with it signified an important stage in the evolution of the organic world towards human society with its consciousness and language. Simultaneously with this basic line of anthropoid evolution there must have progressed another, no less significant line, distinguishing the anthropoids from all the other higher animals, namely, the australopithecine herd mode of life.

C. Herd Life of the Australopithecines

The australopithecines' constant implemental activity naturally affected their life together. In the opinion of specialists, an australopithecine herd had to be larger than that of the chimpanzee and gorilla, and was comprised of se-

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[1] K. Oakley, "The Earliest Tool-Makers", *Antiquity*, Vol. 30, No. 117, March 1956, p. 6.

veral dozen individuals, who were much better organised.

Indeed, the very need to hunt for different animals presupposed a greater diversity of relations between herd members than in procuring vegetable food, which process is totally individual in character. Hunting for relatively big animals required a certain kind of group organisation as well as precise, coordinated actions of special groups of males. Obviously their constant hunting, experience in the use of natural tools made it easier for them to enter into diverse contacts, come to each other's aid. Defence against beasts of prey was bound to play a similar role in the consolidation of an australopithecine herd and in the complexification of their relations with one another.

But hunting and defence also indirectly influenced the complexification of the australopithecines' herd life, to wit, through other constant actions engendered by these processes. The hard-won prey had to be safeguarded against beasts of prey, carted to the campsite, prepared for use, etc. All these complex actions were bound to bring about corresponding complex relations between the individuals performing them.

The australopithecines' new (compared to all other animals) type of implemental activity obviously also resulted in the complexification of their relations in the sphere of reproduction. First, the time spent on the upbringing and training of offspring was bound to increase. Even with chimpanzees and gorillas it stretched out from 10 to 12 years.

The much more complicated problems of

reproduction of normal offspring, obviously, determined also the development of both the higher and lower apes' inherent tendency to show common concern for the young. In view of all the difficulties, this was the only way not only to preserve the herd's size, but even increase it, and successfully to teach the young the necessary knowledge and skills in cooperative implemental activity.

The appreciably changed life of australopithecine herds predetermined also corresponding changes in their structure compared to the herds of modern apes and their common ancestors. First, new groups of individuals must have appeared inside the herds. Whereas in chimpanzee and gorilla herds the presence of groups was determined by only two needs — to ensure the defence of all herd members against external and internal enemies and also the upbringing and training of the offspring (the former function was performed by groups of adult males, the latter — by the females, while food was procured individually), in australopithecine herds the principle of division into such groups was already different. The constant performance of complex hunting, defence and other types of activity demanded of the australopithecines a different physical and psychic training and, consequently, also their unity along these new lines. Scholars believe that in pre-human herds there must have existed groups of adult males who undertook the function of hunting big and swift-footed herbivores and defence against predators; carting of prey to the campsite, etc. Accordingly, the females had to unite above all for the upbringing of offspring, procurement

of vegetable food, and for helping the males in utilising the prey. In the opinion of N. A. Tikh, in australopithecine herds there no longer existed separate groups of the young, which we see in all ape herds, for "they were inevitably drawn into the common cycle of joint procurement of food. Only babies could remain outside the circle of this activity. Those a little older could be enlisted in gathering vegetable food, and perhaps also in its preparation... Physically strong and swift-footed adolescents could be enlisted in hunting and in cutting up the carcass, and carting the prey"[1].

Second, the appearance of different types of permanent implemental activity was bound to lead to the strengthening of ties both within corresponding groups as well as among them. It may be assumed that such ties were in the nature of mutual complementation and compensation of certain activities by others that were essential for the normal course of the australopithecines' life.

Third, facts show that an australopithecine herd, as distinct from the herds of all known lower and higher apes, lived for long periods in one place. Such an attachment to their habitat stemmed both from the nature of their new activity and the prolonged childhood and helplessness of the young. This feature of australopithecine life also promoted the consolidation of herds, the shaping of more complex relations than those of ordinary apes, and the formation of intimate relations between them. Specifically, sexual relations were bound to

[1] N. A. Tikh, *Op. cit.*, pp. 288-289.

become more regulated. At the same time, the hierarchical system of relations between herd members and the leaders' role in it (both of which the australopithecines had inherited from their ancestors) must have changed, too. Besides the usual functions of upholding order in the herd by conciliating the quarrelling, punishing the guilty, etc., the leaders were bound to pay more attention to a primary and more complex task of the herd's daily activity in procuring, processing and distributing food, etc.

Thus, it was the australopithecines' transition to the systematic use of natural tools for the satisfaction of their vital needs that served as the chief cause of progress in their herd life, which found expression in increasing herd size, perfection of individual and group relations of their members, and increasing regulation of their cooperative actions. One can agree with J. Desmond Clark that "the Australopithecines were not aggressive 'armed killers'."[1] Though the australopithecines hunted and ate meat, in their relations with each other and, quite likely, in relations with members of other herds they displayed peaceableness, and did not wage a struggle for the place of abode. Only the unity and peaceful nature of life in an australopithecine herd and relations between them could promote their flourishment. In the opinion of many biologists and anthropologists, in the struggle for existence the advantage was held by those australopithecine herds whose members were more friendly and skilful in handling the

[1] J. Desmond Clark, *Op. cit.*, p. 66.

natural tools used for the satisfaction of common herd goals.

The characterisation of the australopithecines' herd life would be incomplete without examining their means of communication. Obviously, they were bound to inherit from their predecessors means of communication typical for the higher apes — mimicry, poses, sounds and gestures. It is no less obvious that the members of australopithecine herds were bound to communicate in a way differing from that of gorilla and chimpanzee herds, for the usual means of communication could hardly have ensured the normal course of their complex herd life. Specialists have still not reached a concensus on this matter. Some of them, supporting the opinion of the South African researchers Raymond A. Dart, Robert Broom and J. Robinson, presume that the australopithecines had a system of symbols in the form of definite gestures, poses, etc., i. e., a language with the aid of which they were able to lead a normal existence. Other scholars hold that all that was necessary for the normal course of life was improvement of the usual means of communication between apes.

In our view, the first opinion is insufficiently substantiated. As will be shown below, symbols and their systems (human speech) did not appear until much later, together with social labour and the consciousness of the first human beings. A more developed form of gestures and sounds apparently sufficed for the australopithecines' normal life. It may be assumed that an adequately developed system of gestures, i. e., a sign language, served as the main means of

communication for the australopithecines in carrying out different cooperative implemental actions. What brings a sign language close to implemental activity is, first, its structure and, secondly, the organ of performance — the hand, which is capable of diverse actions with objects as well as of diverse gestures.

To throw light on the specifics of the australopithecines' sign language it is useful to compare it with that of Washoe and other experimental apes, who learned Ameslan. Like these apes, the australopithecines in their daily implemental activity and communication had to learn a set of typical gestures, the number of which increased with time. These gestures, apparently, consisted of the often repeated hand actions with objects (bones, stones, sticks) in the process of cooperative activity for defence and procurement of food, as well as the stereotype gestures of communication with each other.

Like Washoe and other experimental apes who, as we saw, were able to differentiate gestures from objects and actions and to anticipate by them their future actions, the australopithecines, apparently, were also capable of using typical gestures to identify future cooperative actions and to continually coordinate them. This aspect of the australopithecines' gestures, in turn, determined the possibility of uniting them in complexes, as in the case of experimental apes. Such complexes of gestures helped them in planning and jointly carrying out complex implemental activity. Let us note, finally, that the australopithecines' gestures that helped their normal vital activity were specifically addressed to definite subjects and objects of action.

Only this made them meaningful. Specifically, this aspect of the australopithecines' sign language made it possible for them to appeal for help not in general to all herd members, but to those capable of rendering it and with the aid of definite natural tools.

Proceeding from an analysis of factual data on the australopithecines and theoretical considerations, it may be assumed that the sign language in its developed form served as their chief means of communication. But the language of gestures alone, apparently, did not suffice, primarily owing to its limitations: its use hampered the performance of manual implemental actions, i. e., the hand's most important actions; gesture signals were effective only when australopithecines were within each other's sight and during daylight. Therefore sound signals were bound to play an increasing role in the australopithecines' communication, which became more developed in their case than in that of the chimpanzees and gorillas. N. A. Tikh considers that the australopithecines already "may have distinguished individual phonemes, which were primarily not a reflection of an individual's emotional state, but represented addressed sounds, bearing the function of a ban, approval, or information about external and intra-herd events."[1]

At the same time the australopithecines' sound signals cannot have been adequately perfected. First of all, this was not demanded by life itself, which consisted of a multitude of links between herd members that could be

[1] N. A. Tikh, *Op. cit.*, p. 177.

mastered by sight. Besides, a study of the australopithecines' organs of speech from their skeletal remains, conducted by the American linguist Philip Lieberman and his colleagues, clearly showed that like the chimpanzees, they were incapable of uttering articulate sounds, nor of joining the latter into phrases.

D. The Psyche of the Australopithecines

If we look at the above data on the australopithecines' bodily structure from the viewpoint of the achievements of present-day zoopsychology, physiology, neuropsychology and other sciences, we can definitely say that by the level of development of their psyche, cleverness and adaptability they were superior to all other animals, including contemporary ones. The psyche of animals is largely affected by the perfection of their working organs. As studies have shown, it is thanks to the functioning of its working organs that an animal receives the most important biological information. The results of their actions are the goal of the entire act of behaviour, and it is these that are first of all impressed in the animal's brain in the form of an individual behavioural experience, which is the basis of the animal's future successful actions.

The australopithecines lived in a great variety of natural conditions and with the aid of their flexible hands as well as their perfected organs of sense and brain they performed diverse operations with objects surrounding them, using the latter as tools. Since the psyche is a part of all acts of behaviour, the diversity and per-

fection of behavioural acts directly determined the high level of its development.

An especially big role in the development of the australopithecines' psyche was played by their systematic use of a great variety of natural tools (bones, stones, sticks), for it continuously enriched the australopithecines' memory with a knowledge of these objects' essential properties, facilitated their struggle for existence, helped them find the most expedient ways of action with the aid of such objects in each concrete case, etc. In turn, the more developed behavioural experience of each adult australopithecine enabled it more flexibly to plan future goals, better to coordinate their fulfilment.

Evidently, the australopithecines' psyche, like their acts of behaviour, which were purely biological in essence, was also totally biological in character. As with contemporary anthropoids, it included sensory images of surrounding objects and tools in the form of integral notions about them and about their association with each other, and also the experience of handling objects and tools accumulated in the course of life and similar to the experience of behaviour of experimental anthropoids. Finally, the development of the australopithecines' psyche was bound to find expression in a greater (than in the case of contemporary anthropoids) diversity of mental actions, their ability more speedily and effectively to use knowledge to determine the goals of action, complexes of interconnected goals, the ability to change the latter, etc.

Vitally important for the development of the

australopithecines' psyche was the increasing complexity of herd life, demanding of them above all a knowledge of accepted "rules of behaviour", which were different for the males and females, for adults, the young, and the babies. All this developed in them such psychic qualities as attentiveness, memory, speedy reaction to changes in the situation, perseverance, and an ability to foresee coming events. In present-day science this level of development of the psyche of animals has come to be known as *rational.*

Thus, a whole series of material causes determined the appearance several million years ago of the australopithecine ancestors of man, who possessed the most perfect bodily structure of all animals, systematically used natural objects as tools and led a very complex mode of herd life with its diversified relations, and hence, also possessed the most developed psyche. The above-cited results of experiments with contemporary higher apes indirectly confirm this conclusion. As we saw, the main causes of the perfection of the psyche of higher apes was above all the growing complexity of their implemental activity, acts of communication between each other and with people, the learning of new, gesture means of communication, i. e., practically all the causes that determined the appearance of the more developed psyche of the australopithecines. Hence we can judge of the character of the australopithecines' psyche also on the basis of the results of numerous experiments in the development of the psyche of the chimpanzee and gorilla in experimental conditions.

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In this connection there arises another question — how close is the australopithecines' psyche to human consciousness? Can it be considered the basis of the appearance of the latter?

§ 2. The Australopithecines and Man

A. The Bodily Structure of the Australopithecines and Man

Let us compare the main features of the anatomy of human life and man's bodily structure with the corresponding aspects of life and bodily structure of the australopithecines.

Science has established the distinctive features of man's bodily organisation (in comparison with all extant and previously existing animals, including the higher apes), which ensure him the possibility of working, entering into diverse social relations, talking and thinking. First, *erect walking* and the clear-cut distinction between hands and feet, and also, a specific structure of the pelvis, spine and other parts of the body, including the organs of speech. A meticulous study of numerous australopithecine skeletal remains has shown that they continuously walked erect, though their locomotion was not as perfect as it was later to become in the case of man. "Despite the fact that these fossil primates walked primarily on their two feet," wrote V. P. Yakimov in this connection, "the morphological complexes of their locomotory apparatus had not yet achieved evolutionary perfection. It is quite possible that the

australopithecines' locomotion was functionally still at the stage of genesis."[1]

Thus, erect walking, as an important distinctive feature of the australopithecines' bodily structure, may have facilitated their transformation into human beings.

But erect walking made sense only if *the hand became a permanently operating working organ*, capable of performing different actions with surrounding objects. We saw that, in this second main anthropological feature, the australopithecines also differed greatly from all apes, more closely resembling man. V. P. Yakimov notes that there are indications of a definite tendency of their hand developing in a different direction from that of contemporary anthropoids which are close to hominids. This is reflected, in general, in the layout of its bones, in the development of the thumb, and in the latter's opposable position to the rest of the fingers. In short, this anthropological feature also enabled the australopithecines to evolve into human beings.

The matter is more complicated regarding the third main hominid feature — the *brain*. Needless to say, an important progressive indication of the development of all animals is their increasing brain volume. In this respect man is unique: his brain volume, along with a comparatively low body weight, averages 1450 cm^3. In brain volume (which, as already noted, amounts to approximately 500 cm^3) the australopithecine stands much closer to the

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[1] V. P. Yakimov, "The Australopithecines", in: *Hominid Fossils and the Origin of Man*, Moscow, 1966, p. 70.

chimpanzee and gorilla than to man. We will deal later with the causes of such a big difference in the brain volume of man and the australopithecine, as well as with the factors that helped to overcome it. Here we merely note a number of peculiarities of the australopithecines' brain. The lower sincipital region, the sincipital-temporal-cervical sub-region, the Broca* centre and the prefrontal region are considered the phylogenetically** new, specifically human parts of the cortex. It is these parts of the cortex that are responsible for carrying out the processes connected with speech, abstract thought and conscious behaviour. The study of plaster casts of the skulls of contemporary man and australopithecines showed that the brain structure of the latter resembles to a great extent the structure of the human brain. For example, compared with the brain of an ape it is located in a more rounded skull, it has a more level relief, a slightly more pronounced frontal part and other features. In short, indications of the specific features of man's brain discovered with the australopithecines bear out the possibility of their brain being transformed into the brain of man.

Without dwelling on the scientifically proven

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* The motor centre of speech in the brain, discovered in 1863 by the French anatomist and anthropologist Paul Broca, who established that damage to the lower-hinter part of the frontol cortex of the left hemisphere causes an impairment of speech (aphasia). Patients are unable to pronounce a word while being able to write it.— *Ed.*

** Acquired in the course of evolution of the world of organisms.— *Ed.*

similarity of the australopithecines' teeth and other bodily organs to those of man, the cited data suffices to draw a definite conclusion that the australopithecines not merely represented the highest level of animal development, but by their bodily structure, which contained elements of the bodily structure of man, were ready to start out on the protracted road of evolution in the direction of man. This confirms the correctness of the opinion of many scholars on the futility of looking for the "missing link" between the australopithecines and man.

B. The Natural Tools of the Australopithecines and Man's Technology

A specific feature of human society, as already noted, is the presence in it of the so-called "second nature", or "artificial environment", in the form of an enormous amount of machine tools, machinery, objects used for cultural development and for household purposes and created by the labour of generation upon generation of people. As distinct from the constructions of insects or some types of animals the "second nature" is objective with respect to individuals, social in origin and use, and contains a multitude of continuously growing social information. Relying on the method of study proposed by Karl Marx, let us attempt to elucidate whether the australopithecines' natural tools contained signs of the technology of a primitive society, and whether (and to what extent) they could have served as a precondition for the appearance of the rudiments of the simplest means of production.

Understandably, the natural tools of australo-

pithecine herd members were fundamentally different, both in function and properties, from the technological and other means used by man. In all likelihood, they were entirely individual. Each australopithecine, we will recall, in accordance with his physical characteristics, experience and knowledge of the use of surrounding objects as tools, could select from among stones, bones and sticks those that suited him; he could throw them away, if need be, and substitute them with new ones. In short, the australopithecines' implemental activity was individual in character, as distinct from the social nature of human social activity, the use by man of the means of labour.

Yet the australopithecines' implemental activity had features similar to human labour activity and paved the way for the appearance of the latter. Wherein lay this similarity? First, the natural tools used by the australopithecines thanks to such qualities as hardness, stability of form, etc., became tools of repeated use in hunting, cutting up the prey, digging up plants, etc., and hence, promoted the formation in australopithecine herds of a kind of implement fund, similar to the fund of artificial implements in human communities. Obviously, neither the existence of this fund, nor its properties and specificity of development depended on the australopithecines' psyche. This extremely important feature of the australopithecines' natural tools may have promoted the appearance of a similar important feature of society's implement fund, its objective nature. The involuntary differentiation of an australopithecine herd's implement fund into definite types of tools made from different kinds of stone, bone, horn, wood,

and its constant renewal owing to the wear and tear of natural tools — which predetermined the appearance of corresponding objective peculiarities of man's artificial environment, i. e., differentiation of man's means of hunting, defence, dressing of prey, etc., which was already social in character — should also be examined from this point of view.

Second, the aggregate of tools used by the australopithecines was bound to promote the appearance of the *social* nature of objects created and used by humans. Indeed, though the direct use by herd members of natural objects as tools was individual, the mass, daily character of the australopithecines' implemental activity transformed it into a general herd activity, which imparted to natural tools, especially their typical forms, a common character, a similar need in them, making possible the appearance of an essentially social, man-made implement fund.

Third, the australopithecines' tools and implemental activity prepared the ground for the appearance of the primitive society's productive forces in the sense of an inherent unity of the labour force and instruments of labour. This unity stemmed from the australopithecines' necessary, imperative association with natural tools, for without the systematic use of the latter they simply could not have existed and developed. More, the australopithecines' functional association with natural tools promoted the appearance of the primitive people's productive forces in the sense of accumulation of experience, skill in the use of tools, their improvement and adjustment. In turn, this predetermined the appearance of primitive people as a labour force capable of

conjointly making and purposefully using diverse instruments of labour.

Thus the australopithecines' continuous use of and association with natural tools of diverse shape and purpose was bound to be accompanied by perfection of the australopithecines themselves, and their tools, which in the aggregate prepared the ground for the appearance of a primitive technology and labour force, and together with them also the social production of material benefits in the form of food, clothing, abode, etc., necessary for people.

What role did the australopithecines and their natural tools play in the appearance of primitive production?

Obviously, the leading, determining role in this process was bound to belong to the australopithecines themselves. It was thanks to their developed bodily organisation, particularly the brain, that increasing possibilities were created for their more complex behaviour, and first of all for that linked with the making and use of tools. Without a qualitative transformation of the australopithecines' body in the direction of the human organism the process of the origin of society and consciousness could not have occurred.

When dealing with the role of natural tools in the process of the origin of society, it is essential to stress the following. Though the development of the australopithecines' natural tools as a whole depended on the improvement of their bodily structure, nevertheless it was this development that directly determined the origin of social production, its character and rate. This circumstance was facilitated by the fact that the genesis of primitive technology was directly associated with

the formation of social relations and human needs, and hence directly affected this process. We must also take into consideration the speedier (in comparison with the human organism) rate of development of primitive technology from natural tools, which was predetermined by the fact that the production of instruments of labour did not require an alteration of the natural properties of stones, bones and other objects, but merely presupposed a change in their form. And one of the inescapable consequences of this was the fact that the genesis of technology (the material part of production) outstripped the formation of the bodily organisation of people.

Karl Marx specially noted the leading role of the genesis of technology in the process of the formation of society: "Darwin has interested us in the history of Nature's Technology, i. e., in the formation of the organs of plants and animals, which organs serve as instruments of production for sustaining life. Does not the history of the productive (! — *D. C.*) organs of man, of organs that are the material basis of all social organisation deserve equal attention?"[1] Consequently, the essence of the genesis of society consists, according to Marx, in the formation of productive, and not biological organs, in the appearance of instruments of labour and their social use. It is precisely the use of machinery and technology that distinguishes people from animals, for it is they that disclose "man's mode of dealing with Nature, the process of production by which he sustains his life, and thereby also lays bare the mode of formation of his social relations, and of

[1] Karl Marx, *Capital*, Vol. I, p. 352.

the mental conceptions that flow from them."[1]

Thus, if the formation of the human body lay at the *base* of the genesis of primitive society, the formation of the instruments of labour expressed the *essence* of this process, the essence of the origin of consciousness.

The development of natural tools and implemental activity in the australopithecine herds prepared the ground for social production in yet another significant respect — its appearance as the sum-total of sectors such as production of the instruments of labour, gathering of vegetative food, hunting, preparation, processing and utilisation of meat and vegetative food with the aid of natural tools, raising of offspring, etc. All these types of the australopithecines' implemental activity, which were interconnected and complemented each other both in the process of their daily occurrence and by their results, played an appreciable role in shaping an analogous association of the sectors of emerging social production.

There is yet another type of implemental activity constantly engaged in by the australopithecines, which had a tremendous significance for the appearance of production. This is the complicated and at first glance, biologically meaningless activity in searching for, stocking and shaping natural tools. But the need for this is obvious. The very practice of constant use of natural tools showed the australopithecines the usefulness of definite forms and properties, compelling them not only to search for usable objects, but also the "work them over" before use. Also obvious is the possibility of a preliminary search for and proces-

[1] Karl Markx, *Capital,* Vol. 1, p. 352.

sing of natural tools. Many apes are capable of such actions (especially, as we saw, in experimental conditions). It is this systematic implemental activity of the australopithecines that prepared the ground for the appearance of the systematic making of instruments of labour, and together with it also social production, which we will deal with specially later on.

Thus, the development of the "implement fund" in australopithecine herds, its systematic and purposeful use prepared in every way the ground for the appearance of the rudiments of social production, and consequently, speech and the consciousness of the first human beings. This preparation went on also along the lines of uniting the essentially individual activity of each herd member into cooperative, implemental activity of groups of men-hunters, women who utilised the prey, etc., and along the lines of uniting each groups with its activity into a single whole, distinguished by a complex (as distinct from other animal associations) structure, and along the lines of accumulation and passing on of knowledge and experience of individual and cooperative behaviour from generation to generation. Consequently, natural tools and their use by the australopithecines may well have served as a direct base for the appearance of rudimentary primitive production.

C. The Psyche of the Australopithecines As a Prerequisite of Consciousness

An important development pattern, which helps us understand the genesis of consciousness is the superfluous development of the bodily structure

of animals, including that of the australopithecines. This especially regards the volume and structure of their brain. As the prominent Soviet biologist L. V. Krushinsky noted, the evolution of the brain "took the road of accumulating vast potential possibilities, far exceeding what was essential for adapting the organism to the changing conditions of its existence".[1] We already saw the big possibilities of the brain of the chimpanzees and gorillas for the development of their psyche in experimental conditions. These possibilities were even more pronounced in the australopithecines' brain with its greater volume and more complex structure, similar to that of the human brain. This fully applies also to the degree of development of their basic working organs — the upper limbs. The australopithecines possessed a developed, flexible hand, capable of the most diverse actions; it was thanks to this quality that they were capable of diversifying their behaviour, and hence, of developing their psyche and gesture means of communication. Studies of the organs of speech of higher apes and partially those of the australopithecines (by their skull fossils) clearly showed that in this respect their possibilities of mastering sound speech were extremely limited.

Thus, the high level of development of the australopithecines' body, especially their brain and hands, and the vast potentialities of its perfection determined the real possibility of the transformation of the australopithecines' bodily structure into the bodily structure of man, and hence, the possibility of transformation of the australo-

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[1] L. V. Krushinsky, *The Biological Foundations of Rational Activity*, Moscow, 1977, p. 234 (in Russian).

pithecines' psyche into the consciousness of the first human beings. Therefore, in order to grasp the essential meaning of the possibility of the transformation of australopithecine psyche into that of man, it is necessary to clarify its association with implemental activity, the australopithecines' herd organisation and means of communication.

The australopithecines' complex, diversified implemental activity invariably enriched them with the knowledge of the properties and associations of a multitude of objects in their environment, first of all those with the aid of which they acted, and those they influenced by their actions. This knowledge was bound to find expression in an aggregate of diverse sensory images in the form of sensations, perceptions and notions. Psychology has proved that notions of objects and actions with them play a particularly important role in the psyche of the higher animals. As integral, stable images of reality, they are remembered by the animals for a long period, and play a decisive role in the formation of acts of behaviour. Such properties of notions as isolation from the objects and phenomena reflected by them, which predetermines the relatively independent existence of notions regarding the reflected object, and also their ability to form different combinations, show that the australopithecines' notions contributed to preparing the ground for the appearance of human images of reality in the form of notions of objects and their properties, man's ability to view them in abstract terms, etc.

The above-cited character of the australopithecines' implemental activity shaped their psyche by speeding up and diversifying the thinking

activity, i. e., transforming notions into goals of activity and their combinations. Such a highly-developed form of thinking in sensory images, based on the rich individual and herd experience of the systematic use of different objects and tools was instrumental, as will be shown further, in the appearance of the simplest forms of human thought.

Finally, the diversity and complexity of the australopithecines' implemental acts of behaviour and the associated development of their psyche were bound to find their reflection in a more meaningful and accurate correspondence to reality of their sensory images and goals of activity. This feature of the australopithecines' psyche was, on the one hand, instrumental in their survival, settlement in other regions of the planet, and on the other, a prerequisite for the appearance of human consciousness with its fundamentally different content and correspondence to reality.

The australopithecines' herd way of life predetermined the substantial development and herd character of their psyche, as manifested in the accumulation and passing on to posterity of their skills in the shaping and utilisation of surrounding objects as tools, exerting influence over animals and plants, knowledge of their essential properties and associations, knowing how to conduct oneself in the herd, etc. It may be assumed that the herd's common store of knowledge and skills, which existed and developed in the australopithecines' individual acts of behaviour, had common features with the social character of human consciousness, the essence of which also consists in the accumulation, continuous development and passing on from generation to generation of the

best examples and results of the individual conscious acts of behaviour of collective members. Consequently, the development of the australopithecine's psyche in this extremely important sphere also prepared the ground for the appearance of an essentially social consciousness.

We must note yet another important feature of the psyche of the australopithecines, which also greatly influenced the transformation of australopithecine herds into communities of the first human beings and, accordingly, the evolution of the psyche of these ancestors of man into human consciousness. We have in mind the so-called altruistic, peaceful nature of the principal goals and interests of the australopithecines, which predetermined, among other things, the peaceful nature of their behaviour towards each other, the herd members' constant effort to suppress their egoistic inclinations, excesses, and aggressiveness. The necessity of such behaviour was dictated, first, by their being substantially weaker physically than beasts of prey. Only consolidation, mutual aid of herd members enabled them more or less successfully to defend themselves, hunt and distribute prey. Second, such a level of behaviour was a condition of survival, for the australopithecines constantly used stones and heavy clubs in their activity. Clearly, the result of conflicts between herd members, especially the males, armed with such tools, differed greatly from conflicts solved with the aid of natural, weak organs. Therefore a herd had a vital interest in not permitting such conflicts, preserving the life of its members, especially those more skilled in hunting, defence and other types of activity, who were capable of living together peacefully. The main

mass of australopithecines developed an altruistic psyche also because they inherited their ancestors' firmly rooted traditions of peaceful behaviour and general peaceableness. The correctness of this conclusion is confirmed by a study of the behaviour of chimpanzees and gorillas, the direct descendants of these same ancestral apes.

Thus, the difficulty and complexity of the australopithecines' community life, the need to uphold order in it, to coordinate their actions, their highly developed bodily organisation and psyche predetermined the possibility and necessity of the herd members' continuous mutual assistance in carrying out the main types of implemental activity and in rearing their offspring. In turn, this type of life was bound to affect the nature of their psyche. It will readily be seen that the above-cited peculiarities of the australopithecines' way of life created possibilities for the appearance of an even better organised community life of primitive man, an even more developed, altruistic and purposeful nature of his psyche, and social character of his consciousness.

D. The Australopithecines' Means of Communication

It will be recalled that the psyche, especially a developed one, cannot exist without the corresponding means of its expression and passing it on to other individuals. This is borne out by the example of the apes' herd life in natural conditions, and in examining the results of experiments in teaching Ameslan to chimpanzees and gorillas. Obviously, the australopithecines' more complex daily life was bound to evolve more diversified

and complex means of communication, corresponding to the higher level of development of their psyche. In this respect a big role was played by the progress of gesture means of communication, with a definite, identical content for all herd members. With their aid the australopithecines, in all likelihood, were able effectively to coordinate their cooperative actions during hunting, defence, etc., thereby helping to transform such actions into conscious acts of labour. With their perfection, the australopithecines' gesture means of communication were also bound to be conducive to the appearance of purely human means of communication, and hence also human consciousness.

As a whole the level of development of the australopithecines' psyche had to be higher than that of all other animals, including those living today. This is borne out by both the volume and depth of the australopithecines' reflection of environmental properties and associations essential for their complex vital activity, and also by their impact on the behaviour of other community members.

The above-cited characteristics of the australopithecines warrant drawing the conclusion that they constituted the highest stage of evolution of the animal world. Apart from the listed peculiarities of their way of life, this conclusion is also supported by their biological flourishment. The latter signified an increase in the number of australopithecines, their migration to all parts of Africa and other regions of the planet, and their capacity for further progress. Obviously, only a flourishing species was capable of ushering in mankind. At the same time it should be borne in

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mind that the australopithecines still remained in the animal world. The constant use of natural tools did not take them outside the animal world, for these tools were accidental both in their form and properties; as was the case with apes, the tools were used individually, and their sum-total did not as yet form a single, integral phenomenon that could develop according to its own laws, as in the case of man. In addition note should be made of the purely biological nature of the stimuli of the australopithecines' behaviour (the biological needs of individuals and the herd in food, defence against beasts of prey, raising of offspring, communication, etc.), the largely voluntary nature of their cooperative actions and so on. They faced an extremely protracted period of development before acquiring the capacity for labour, speech and consciousness.

As a whole the australopithecine herd was not merely a rung in the evolutionary ladder of the animal world. It represented *its concluding stage,* a springboard for the leap (given favourable external conditions) of the animal world into human society.

How were the numerous australopithecine herds, which had migrated to all parts of Africa and other regions of the world, able to take this historic step into a new, completely different condition? How and why was their as yet essentially biological psyche transformed into human consciousness? Was it an independent process or was it part of a more complex evolution? Was the transformation direct or indirect?

Scholars give different and often contradictory answers to these difficult questions. Without burdening the reader with an analysis of special

approaches and interpretations of specific aspects of this complex problem, we note only two main antithetical directions of its solution — the idealist and the materialist. A representative of the former, for instance, is the above-cited Teilhard de Chardin, whose reasoning boiled down to the assertion that the psyche of man's ancestorial animals, as a manifestation of the ideal world substance, directly turned into human consciousness, merely relying on the development of the animal's bodily structure into that of man. Contrary to this position the overwhelming majority of scholars uphold the materialistic concept of the genesis of consciousness as an aspect of the appearance of society. The data on the results of experiments on the development of the psyche of apes, their observation in natural conditions and especially data on the vital activity of the australopithecines permit an in-depth study of the transformation of the australopithecines' psyche into human consciousness and help provide a reply to the above questions.

We saw that the comparatively richer (than that of other apes) psyche of the australopithecines and their more flexible thinking — which was instrumental in the australopithecines' speedy and effective solution of diverse complex problems in the process of hunting, utilisation of the prey, defence, etc.— did not appear and develop by itself, but as an important aspect of the australopithecines' community life and the complex forms of their implemental activity and herd relations. It developed as a property, function of the australopithecines' rather complex and voluminous brain. Among the

above-cited factors, which engendered and developed the psyche of the australopithecines, a crucial role was played by their complex community life and the diversity of herd relations. It was this sum-total of the australopithecine herd associations, the complex structure of their herds that determined above all the nature of their psyche: first, directly, through the development of herd means of communication, with which the psyche is directly associated, by stimulating the psychic activity of herd members for the solution of common problems; second, indirectly, with the aid of passing on experience of behaviour accumulated by the herd to ever new generations, and also, possibly, by the elimination of individuals incapable of effective cooperative actions or who hampered them.

It may be assumed as well that the further development of the australopithecines' psyche towards that of man did not come about by itself, but was an essential aspect of the australopithecine herd's transformation into the first social collective of human beings, and that their psyche had to be influenced by material factors, including natural selection, increasing complexification of the australopithecines' bodily structure, their implemental activity, herd relations, etc.

Let us recall that the primary cause of the development of the psyche of Washoe and other apes in experimental conditions was their inclusion in society, in the families of people with their complex system of social relations.

CHAPTER FOUR

THE EMERGENCE OF CONSCIOUSNESS

Scholars have long been discussing the causes of the emergence of human consciousness, the time and mechanism of the transformation of ape psyche into human reason, the difference between them, etc. Naturally, we cannot give the reader an exhaustive reply to all these questions owing to the extreme complexity of the problem and its incomplete solution by contemporary science, as well as the limited size of the book. Therefore our task will consist in laying bare only the main aspects of the genesis of consciousness in the light of modern science and Marxist doctrine.

As we already mentioned, the cooperative implemental activity of the australopithecines and their complex herd relations promoted the development of the australopithecines' means of communication and psyche, the perfection of their bodily structure, especially the brain and hand, and hence was instrumental in the emergence of consciousness. In short, the conception of consciousness was a multiform process; it, apparently, did not merely appear as a result of the growing complexification and perfection of the psyche of man's animal an-

cestors, but constituted an important aspect of the transformation of australopithecine herds into the first rudiminary social collectives of incipient human beings, into their primitive herds. It is to this systemic key, drawing on the latest scientific data on the transformation of australopithecine herds into new social communities of the first men, initially in an embryonic form, which were subsequently transformed into genuine primitive tribal communities of people, that we trace the process of the emergence of consciousness.

§1. The Causes of the Conception of Consciousness

Scientific data provides irrefutable evidence of the fact that the transformation of the australopithecines with their highly-developed animal psyche into modern man (Neanthropus) took place over a period of several million years owing to its own objective laws, which will be dealt with below. Understandably, the fundamentally new community of primitive people could not have appeared all at once. And facts show that it appeared in embryonic form. But what is an embryo of the new? Simply a modified, changed form of the old, as a number of scholars presume? Or a fundamentally new phenomenon, though as yet undeveloped and extremely weak, as others maintain? The direction of study of the genesis of consciousness depends to a great extent on the correct answer to this question, and therefore we will dwell on it here.

Proceeding from general methodological

considerations and the practical life of people, it may be assumed that specialists adhering to the latter viewpoint are correct. Indeed, the australopithecines' individual implemental activity could not all at once have been transformed into the collective conscious labour activity of primitive man with his language, social division of labour, distribution of the output of production in accordance with the standards and rules of behaviour, etc. Certainly the transformation of the australopithecines' bodily structure into that of contemporary man could not have been a speedy and straightforward process. On the other hand, the appearance of rudiments of the new signified the transition of the australopithecines' ancestors onto an entirely new, human road of development, which culminated in the appearance of human beings. Concluded in a similar manner are all development processes. Let us assume that a youth, on entering life, comes to work at an institution or factory without having acquired a speciality. In the beginning he, naturally, will be learning a new trade, remaining for a time unskilled and retaining his old habits, ideals, etc. But he — whether office or factory worker — has already embarked on an entirely new life, joined an entirely new association of people with its own customs, goals, and attitudes to one another. The same goes for the formation of some new organisation of people, for example, a political party or a club: they, as a rule, come from dissimilar groups of people which in the process of joint action for the sake of common goals unite into an organised whole.

Obviously, the process of the transformation

of australopithecine herds into the tribal communities of primitive man had of necessity to go through a stage of origination, which may be outlined as follows. In all likelihood, the embryo of a tribal community represented not merely a modified australopithecine herd or its members, formed for instance, due to the mutation of their brain or to the complexification of their ties with each other, but a fundamentally new phenomenon, as yet in an undeveloped, immature form, which was destined to go through a protracted path of transformation into a primitive tribal community. Basing ourselves on such an understanding of the beginning of primitive society, we will attempt to specify all that was new in the life of the australopithecines' descendants — the first incipient human beings, and on this basis to lay bare the sources and characteristics of human consciousness which distinguish it from the psyche of the australopithecines. It should be stressed yet again that the cause of the appearance of consciousness in its embryonic state is not the self-development of the australopithecines' psyche, but the emergence of social production, new, social relations and needs, that appeared together with the first collectives of incipient human beings. Let us continue the analogy suggested above: the new, professional consciousness of a youth starting out on his first job, does not appear simply out of his former psyche, though the latter's influence on the formation of the new psyche of a specialist is undeniable, but out of his new activity, new relations in the collective, on the basis of which he unwittingly acquires other habits and goals of behaviour, knowledge and

experience, i. e., in many respects a new consciousness.

How did the embryonic social associations of incipient men appear? And can we judge of it after the passage of millions of years? In this we are assisted by philosophical and other scientific methods of studying facts, including a systemic approach to their analysis.

The systemic approach shows that all complex systems begin their transformation into new, more complex, developed systems with the perfection of functions and behaviour of groups of their elements. This in turn, leads to the complexification of the systems themselves and their relation towards each other. As a result the original system increasingly breaks up into groups of its members, with new systems appearing in the process of the struggle between these groups. It is in the light of the systemic approach that contemporary biology reveals the process of transformation of populations of one species into another.

Hence it may be assumed that also some australopithecine herds, and precisely the ones where implemental activity and the related herd relations had reached the highest level of advancement, developed in a similar manner towards the first associations of human beings. Studies conducted by S. A. Semyonov and other Soviet archeologists have shown that the systematic use of natural tools and their constant modification and perfection could have been transformed into a rudimentary production of diverse implements, or means of activity. In short, the australopithecines' main function, their systematic implemental activity was trans-

formed gradually and in a natural manner into daily activity for the production of instruments of labour, the need for the appearance of which was quite obvious. First, it inevitably and spontaneously arose from the implemental activity: the natural tools tended to break, crumble, producing chips with sharp edges, splinters of stones and bones, with the aid of which it was easier to rip up the skins of killed animals, to cut up the meat, shape the wooden clubs, etc. Second, the australopithecines could not help noticing the merits of these tools and, consequently, increasingly engaged in the deliberate making of various means of their activity. The possibility of performing such actions was determined by the relatively high level of development of the australopithecines' brain, organs of sense, hands, the involuntary accumulation in many herb members of experience, skills in improving natural tools, the involuntary shaping up of their optimum forms for the succeessful performance of the most important operations, etc.

Hence, it may be assumed that the implemental activity which appeared in a number of australopithecine herds began to be gradually transformed into activity for the systematic production of diverse instruments, which differed from natural tools by their greater convenience, reliability and efficacy. Naturally, this activity was bound to differ from that preceding it not only by its results, but also its new characteristics, which we will dwell on below.

Science is advanced and discoveries are made by hard-working people who are prepared to forgo personal comfort, advantage, and capable of self-sacrifice. One of them was the above-mentioned young Dutchman Eugene Dubois, who, giving up the career of a medical officer, set out to the Java jungles in quest of a hypothetical creature predicted by Darwin's associate Haeckel, which he called Pithecanthropus, i. e., ape-man. And Dubois' fervent belief in the existence of this intermediate link between man and ape was fully justified. In the late 19th century he discovered several skeletal fragments of these creatures, thereby making a substantial contribution to science on the origin of the human race. The spouses Mary and Louis Leakey were also prominent scientists, who spent years in uninterrupted search of man's ancestors in the deserts and mountains of East equatorial Africa. Their incredibly difficult search was crowned with brilliant successes. In 1959 they found in Olduvai Gorge in northern Tanzania near Lake Eyassi the skeletal remains of a creature closely resembling the massive bodily structure of the australopithecines. It had a brain volume of 530cm^3, and next to it were found primitive, deliberately made stone tools. Mindful of this circumstance and a number of progressive indications of the bodily organisation of the given creature, Louis Leakey gave it the name of Zinjanthropus, i. e. "East African Man". The following year found in the same location were the remains of a creature even

closer to man (to date the remains of five such individuals have been discovered), together with a large number of stone tools and other cultural fragments. Louis Leakey named it *Homo habilis*, i. e., "skilled man", capable of making various tools and other essential items. Shortly afterwards, with the aid of the latest research methods, scientists determined the age of the unique find — approximately 1.75 million years; also restored were the bodily structure and the mode of vital activity of these ancestors of man.

Homo habilis represented a creature 122-140 cm in height with erect gait. He had a larger brain volume — approximately 670 cm^3, and a more complex structure than the australopithecines. The upper and lower jaws of Homo habilis were smaller than those of the australopithecines and, consequently, evolutionarily approached those of man. Its hand was more primitive than man's in many respects, yet fully capable of making stone and other tools.

Soon creatures similar to Homo habilis were discovered in other parts of the region. Thus, found at Koobi Fora east of Lake Turkana (Rudolf) was a great quantity of the remains of creatures identical with Homo habilis, and who had lived at approximately the same time as the latter. According to Mary Leakey's description, their bones differed little from the corresponding bones of modern man. Found here also was a skull, which was designated by the number 1470, with a volume of 800 cm^3— almost equal to the skull of Pithecanthropus (860 cm^3), which lived much later. But unlike the latter, it had less thick bones, a less pro-

nounced crest and other indications approximating it to the skull of man.

On the basis of these and other established facts many scholars state with good reason that Homo habilis represents the initial stage of the formation of the modern species of man.[1] Homo habilis already possessed the main features of man's bodily organisation (a developed brain, flexible hand, etc.), which permit drawing the conclusion that these creatures systematically made stone and other tools. This is borne out by the above-cited data on the ability of anthropoids with their much less developed brain and primitive hand to perform complex actions with objects, including the making and rational use of different tools.

What were the Homo habilis' tools like? Over several decades Mary Leakey meticulously investigated and established beyond doubt the basic forms and main functions of these tools.[2] Discovered in the lowest, Bed I, of the excavations at Olduvai Gorge, were the most primitive tools of the chopper type — coarse chopping tools for cutting up the carcasses of killed animals, shaping of clubs, etc. The Homo habilis made such tools out of coarse gravel and chunks of rock of different kinds, primarily out of volcanic lava, pieces of which they brought from dozens of kilometres away.

Numerous splinters of different shape, ob-

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[1] See: P. I. Boriskovsky, *The Ancient Past of Man*, Leningrad, 1979.

[2] See: M. D. Leakey, *Olduvai Gorge. Excavation in Beds I and II (1960-1963)*, Vol. 3, Cambridge University, 1971.

tained by breaking up stones, were with a little shaping easily turned into the small tools with sharp edges essential for the incipient human beings. With their aid man cut tendons and meat and performed diverse actions in the processing of animal carcasses, bone and wooden tools, etc.[1] A vast amount of such tools made out of splinters were discovered primarily in Bed II. Many of them greatly resembled the much later Mousterian drill and scraper type tools of the Neanderthals. Found here also were the Chellan and Acheulean[2] choppers, round stones of unknown purpose and other tools, which heretofore were considered tools of later incipient human beings[3], and also

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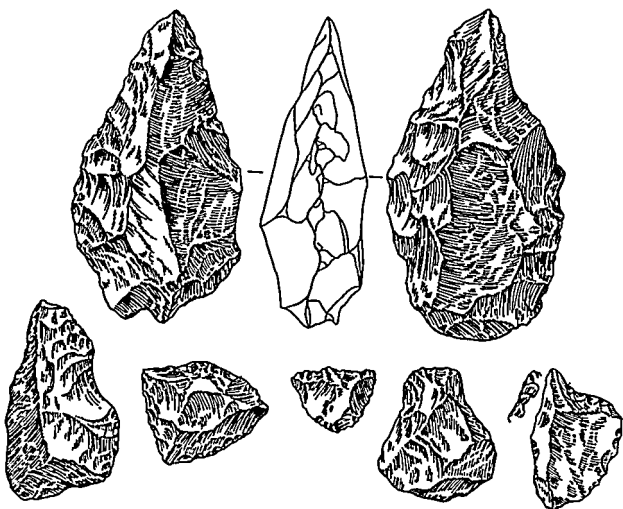
[1] See: A. E. Matyukhin, "Experimental Study of the Technique of Making Gravel Tools", *Sovetskaya Arkheologia*, 1976, No. 3, pp. 9-10 (in Russian).

[2] *Chellean culture* — early culture of the lower Paleolithic in Eurasia and Africa. Named after Chelles, a town near Paris. Characteristic of it are stone choppers and other primitive tools. Economic activity included primitive hunting and gathering by the Pithecanthropi and Sinanthropi.

Acheulean culture — a later culture of the lower Paleolite in Europe and Asia. Named after St. Acheul, a suburb of Amiens (France). Main tools — stone hand choppers, etc. Economic activity: hunting and gathering by early Neanderthals.

Mousterian culture — a later culture of the early Paleolithic in Southern and Western Europe, in the south of the USSR, Southern Asia and Africa. Named after the Le Moustier cave in France. It is characterised by permanent place of occupancy and diverse stone tools. The incipient human beings of this epoch — the Neanderthals — engaged in hunting and gathering.— *Ed.*

[3] Present-day science distinguishes a special transition period between the australopithecines and the incipient human beings of the tribal society. This period is usually designated by the term "primitive human herd". It is subdivided into an

Stone tools of the Homo habilis

various stone scraps, billets, and raw materials. Altogether discovered were hundreds of tools made of eighteen types of stone as well as bone. Undoubtedly there had also existed wooden tools which, naturally, have not come down to us.

That the beginning of tool production took

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early stage (Homo habilis, Pithecanthropi, Sinanthropi) and a *later* stage (early and late Neanderthals). Accordingly, in archeology primitive technology is periodised into the pre-Chellean and Chellean, Acheulean and Mousterian. The technology of the primitive herd as a whole is customarily designated as *lower Paleolithic*, and that of the beginning of the tribal system — as *upper Paleolithic*.

place not only in a single australopithecine herd, but essentially bore a mass character, is borne out by analogous findings in other parts of the region. To cite an example. The above-mentioned campsites of the first incipient human beings in Koobi Fora also yielded many primitive stone tools made out of chunks or rock (choppers, protocutters) and splinters, as well as various types of bone tools. True, here also the cited tools had different shapes, conditioned by accidental phenomena and largely determined by the peculiarities of the raw material.

These facts attest to a qualitative difference in the way of life of the very first incipient human beings from the vital activity of the australopithecines. The main new feature of the first human beings was their systematic manufacture of tools for the performance of necessary activity in procuring plant and animal food, defence, etc. What was the significance of the systematic manufacture of this complex of tools and what is its essence for the transformation of australopithecine herds into the first production collectives?

First, in comparison to the objects used as tools for acting upon animals, plants, etc., the systematic making of different kinds of simple tools constituted a much more complex process. As experiments have shown, it was necessary not only to find from among a multitude of pieces ones suitable in size, form and properties, but also to select wooden, bone and stone implements essential for making stone tools of the required size, properties and forms. It was such implements — hammerstones and

anvils — that were discovered in large quantities in the Olduvai Gorge.

Second, in comparison to the australopithecines' individual instrumental activity, the manufacture of tools by Homo habilis must, from the outset, have been *social* in nature. As we saw, the making of even the simplest tools presupposed a knowledge by individuals of important properties of many kinds of stones and wood, different types of bones, as well as highly skilled actions in the form of different kind of blows at definite points of a stone, the use of anvils, etc. It may therefore be assumed that far from all individuals were capable of such activity, but only those who possessed the necessary physical and especially psychic qualities. And this signified that with the beginning of tool manufacture there appeared rudimentary types of social division of activity between members of a collective: some were bound to concentrate on the making of tools, others — on hunting, while the remaining members, primarily women and children, engaged in other types of cooperative vital activity.

The social nature of the manufacture of tools was especially evident in the process of the transformation of all other types of the australopithecines' activity into that of labour. On the one hand, actions performed with the aid of the social means of labour produced by an australopithecine association — clubs, splinters, choppers, etc.— gradually became a variety of social activity; on the other, all other types of labour activity — hunting, gathering of plant food, defence, etc.— increasingly depended on the manufacture of tools, which was turn-

ing into the nucleus of the system of social production of material boons.

So, the origination of the systematic manufacture of diverse tools resulted in the appearance of a rudimentary system of social activity of the first Homo habilis type of incipient human beings. From the outset, this activity was clearly separated into the manufacture of instruments of labour with no direct biological significance for the members of a primitive herd and the type of labour activity which ensured the incipient people a minimum of the means of existence — food, water, shelter in inclement weather, etc. Obviously, the first former aspect of the incipient social production played a leading, determining role with respect to the latter. The latter, in turn, being constantly in need of instruments of labour, incessantly advanced the manufacture of those means of labour that were required for hunting, defence, etc.

One direct consequence of the appearance of social production was bound to be the appearance of common requirements, which increasingly shaped man's behaviour, compelling every member of a primitive herd to perform work that was necessary for the collective, even if such work ran contrary to his own biological requirements (take, for example, the work of primitive craftsmen who were engaged in making tools, or hunters lying in ambush).

Finally, the systematic manufacture of diverse tools was social in its results — giving rise to primitive technology. As a result of the activity of many generations of craftsmen, the artificial instruments of labour reflected

by their form, properties and functions social knowledge and traditional ways of their manufacture and use. The prominent Soviet psychologist A. N. Leontyev stressed that a tool, being a product of centuries of labour, along with its natural properties also acquired social characteristics, becoming a "social object, i. e., an object with a definite method of consumption, which has been socially evolved in the process of collective labour and which is assigned to it".[1] As will be shown subsequently, primitive technology played a big role in the formation of human relations between members of a primitive herd.

Third, unlike the australopithecines' implemental activity in which the selection of natural tools by an individual and their use depended on the subject's physical and psychic qualities, already the rudimentary manufacture of tools and its results — the tools and primitive implements themselves — from the moment of their appearance existed independently from the individual, from his will and consciousness. In the process of making and using tools the Homo habilis were compelled to submit to the material laws of the interaction of things as well as their properties. Otherwise their activity would not have been successful. The Homo habilis had to adapt themselves also to the socially objective properties of the instruments of labour, store up knowledge about these properties, and develop corresponding skills of handling them. In contrast, with the australopithecines, as we

[1] A. N. Leontyev, *Problems of the Development of the Psyche*, Moscow, 1981, p. 285 (in Russian).

saw, the form and properties of natural tools were adapted to the physical and psychic properties of the individual. The objectivity of tool manufacture was also determined by the fact that both the regularities of making instruments of labour and the regularities of its own development did not depend upon the Homo habilis and subsequent generations of man's ancestors. Each new generation found definite, independent from it, conditions of the manufacture of equipment and level of its development, which is what determined the typical methods of cutting stone and the predominant techniques of handling different tools, and hence was compelled to adapt itself to the technology of making and handling instruments of labour that had come down to it, introducing only slight changes in it. It is no mere chance that the process of the australopithecines' transformation into human beings stretched out for some two million years. Finally, the objective development of the manufacture of instruments and of their evolution found expression, as will be shown further, in the basically identical character of their genesis, in the practically identical results of their development in different regions of the planet.

Thus, on the basis of general theoretical premises and factual data regarding the life of Homo habilis, we can say with certainty that two to three million years ago in the more or less favourable geographic conditions of eastern Africa and in a whole number of australopithecine herds, whose members had reached a high level of development in herd relations, bodily structure and psyche, and implemental activi-

ty, the latter was gradually transformed into systematic manufacture of primitive instruments of labour, equipment. Together with it there occurred also the transformation of other types of implemental activity into different kinds of labour and social activity and their unification into rudimentary social manufacture of the most essential material boons. All this reaffirms the justice of the brilliant, universally recognised idea of F. Engels that "labour begins with the making of tools"[1].

It would be only natural to assume that the appearance of rudimentary social production was bound to bring about changes in the entire way of life of the first incipient human beings in comparison to the life of the anthropoids and australopithecines. Studies of Homo habilis sites — science includes among the latter the inhabitants of similar sites in Koobi Fora, the Omo River basin in southern Ethiopia, Morocco, Tunisia, etc.— fully confirm this. The complex life of these creatures required a lengthy stay in one site near rivers and lakes, near the gathering places of game. This also necessitated the performance of complex operations in the utilisation of the prey, search for suitable stone raw material and transforming it into tools needed by them all. The discovery in Olduvai Gorge of places for cutting up large animal carcasses, places where tools had been systematically made, and other types of economic activity was no mischance. The relatively settled existence of the early incipient human beings was indeed an important new feature of their life, distin-

[1] Frederick Engels, *Dialectics of Nature*, p. 176.

guishing it from the life-style of australopithecines and especially anthropoids, which moved about continually in search of food.

The rudimentary manufacture of tools, and the appearance in Homo habilis herds of a constantly replenished set of diverse instruments of labour was bound to bring the herd members' relation to the environment and to each other, closer towards those of human beings.

Henceforth the relation of each individual to environmental phenomena tended to be increasingly mediated by different kinds of labour activity of other members of the herd, and also by its requirements and goals. For example, a hunter pursuing prey, or a woman digging plants with the aid of a corresponding tool, acted not by themselves, but as members of a production collective, for the satisfaction of not only their own needs, but first of all the needs of the latter. The mediated character of an individual's attitude to the environment was increasingly determined by the social nature of instruments of labour, which not merely strengthened the natural organs of members of primitive herds and enhanced the efficacy of their manual activity, but more and more imparted to their actions a human meaning.

This kind of double mediation of the individual's relation to the environment gradually led to its transformation into a social, human, relation, i. e., one that was social in its goals, means and results and did not always depend on the individual's personal needs and goals. Such a relation presupposed a certain degree of awareness of the collective's goals, as well as of the forms and designation of the instruments

of labour. Obviously, without the rudiments of a new, essentially social psyche the Homo habilis could not have been able to jointly manufacture material blessings, rear their offspring, defend themselves against beasts of prey, etc., that is, they could not have worked cooperatively.

The Homo habilis' rudimentary system of cooperative labour activity — from the production of diverse tools to their purposeful use in hunting, cutting up prey, etc.— necessarily presupposed the daily distribution of vital work among herd members. In what form could it be accomplished? We saw that in the herds of higher animals the distribution of the herd's biological functions took place in accordance with the physical and psychic properties of individuals: adult males guarded the herd against external dangers and upheld order within them, adult females reared the offspring, etc. Ethnographers' observation of the life of primitive tribes has shown that in spite of the social nature of the activity of their members, division of the latter in accordance to a certain type of work was also geared to the biological and psychic properties of primitive human beings. The women were engaged primarily in housekeeping and rearing offspring, strong adult men hunted and defended the collective against external and internal dangers, the old men were occupied with making tools, etc. That is why the essentially social division of labour between groups of men and women, adults and children came to be called the natural division of labour. Apparently the Homo habilis herds also possessed the rudiments of this kind of division of labour,

i. e., a work force and equipment geared to social activity. Understandably, this division of labour was largely involuntary, in which consciousness played a negligible role; it probably was continuously violated by arbitrary actions of some members. However, as an objectively necessary requirement of the herd, this division of labour was gradually bound to gain in strength. Each new generation of Homo habilis increasingly submitted to the demands of developing production, apportioning work to every member of the primitive herd in conformity with his physical and psychic properties.

But the emergence of the manufacture of tools, accumulation of technology in the Homo habilis' incipient production collectives had yet another important consequence — the formation of new, *economic* relations between the Homo habilis, which were extremely important for the genesis of consciousness. The essence of these relations and, hence, the essence of their genesis consisted in the appearance in herd members of a cooperative, common attitude to the territory of habitation, to all its wealth — game, fruit trees, useful plants, etc.— as to their own. In short, economic relations appeared as property relations. It was these relations above all that united all herd members into a single whole and counterposed them to all other primitive herds. Indeed, without the possession of a definite territory, no production or social collective could have existed. This is proved by numerous observations of the life of primitive peoples, an important feature of which was an incessant skirmishing for territory. True, struggle for the possession of a definite territory is also to be

observed among animals. But it is one thing to fight for life on a territory with a wealth of food, as in the case of chimpanzees and gorillas (whose presence on alien territory is considered an ordinary occurrence by both species), but the possession of land as the basis for the production of essentials, and indeed for the production of the very life of the incipient human beings, is something else again. Of decisive importance for survival here is a good knowledge of the location (which is essential for successful hunting and gathering of plant food), the presence of various kinds of stone, especially flint, possession of convenient sites for prolonged habitation, etc.

Property relations were characteristic above all of the process of production of essential material boons. Since the members of primitive herds mostly worked cooperatively and regarded the wealth of the land and instruments of labour as common property, there gradually developed between them economic (production) relations of mutual assistance, mutual support in hunting, defence, and in all other types of cooperative activity.

A Homo habilis herd's common property in natural and manufactured articles also included the constant *exchange* of the latter between groups taking part in cooperative production, for instance, between women and children who gather plant food, and groups of hunters with their prey. As a result, each member of a new collective could receive his share of a product that was manufactured in common. In other words, the herd's common property must initially have been manifested in socio-economic

relations of *distribution.* As in later relations of distribution in primitive tribes, the rudiments of these relations among the Homo habilis were, apparently, also based on the principle of equal distribution, ensuring the survival of all herd members, from new-born babies to adults. True, something similar is observed also in certain species of animals. Thus hyenic dogs after a successful hunt "bring" a part of the food to their burrow by regurgitating a certain amount for the nursing females and the puppies. But the relations of distribution in Homo habilis herds were already quite different, essentially social in nature. First, not merely a certain type of food, but a great variety of food was distributed. Second — and most important — besides food, also distributed were other objects, specially instruments of labour. Third, relations of distribution, as well as other economic relations were increasingly accomplished, as will be shown further, not instinctively, but consciously. J. D. Clark is right in considering that "food sharing is the basis of human society and one of the most fundamental differences between human and mammalian behaviour. That it is practiced by chimpanzees ... is of great interest but this is only a minor part of a very varied pattern of behaviour; their society does not depend upon it as does human society. This is in marked contrast to the picture of the club-wielding aggressor that is usually painted."[1]

As the entire experience of human development shows, it is economic relations of groups of people that plan the fundamental role, shaping

[1] J. Desmond Clark, *The Prehistory of Africa*, pp. 72, 73.

all other relations and the main stimuli of behaviour. Economic relations which in their turn, depend on the levels of the development of man (work force) and technology, always and everywhere determine the character of family, household, and subsequently national, political and other ties between people, the nature of their ideas, goals, and strivings. Obviously, the same characteristics were inherent already in the rudiments of such relations, which appeared with the origination of the manufacture of instruments of labour, though in a much weaker form. Already in Homo habilis associations stable basic economic relations necessarily served as the chief support of all vital activity and the daily assignment of association members to diverse types of activity, regulation of their relations in the production process and outside it.

The appearance of fundamentally new, social relations in the reproduction of offspring capable of going on working, thinking and living in social associations, was an important manifestation of the determining role of economic relations. The reproduction of offspring and its rearing was not only an imperative task, but also one that was extremely difficult to carry out. Indeed, if the training of a young chimpanzee, as we saw, demanded of its parents, first of all the mother, a great deal of effort and knowledge of the properties of useful and harmful plants, habits of various animals, knowledge of how to conduct oneself in a herd, etc., the upbringing of a child demanded of the parents and the entire primitive herd much more effort and knowledge, and a longer period of time.

Obviously, in performing ordinary work groups of incipient human beings and separate individuals must constantly have had to coordinate their actions, enter into definite relations, and there necessarily were formed permanently functioning special relations between adults and children in carrying out important social activities in the rearing of offspring. What did these relations represent? An answer to the question is supplied by numerous observations of the life of primitive tribes, clans. It appeared that with them the rearing of the children was a common occupation of all adult members. (Understandably, in the beginning the main role in the process of rearing is played by the mother.) Inasmuch as a family is part of a clan — an association of individuals descended from one ancestor, a child from the moment of its birth automatically becomes a member of the given clan, all adult representatives of which undertake its further upbringing. The child is taught all the essential knowledge about the environment, hunting and other skills, behavioural norms, etc. By the end of this training a child, as a rule, goes through a series of tests in order to become a full-fledged member of the clan. It may be assumed that, under the influence of the requirements of emergent production, family-clan relations between adults and children appeared already in Homo habilis associations. Only this could make possible the normal implementation — from generation to generation — and gradual development and perfection of cooperative production of material boons.

However, the production of material boons with its economic relations could not be suc-

cessfully accomplished without the establishment of social relations between individuals of opposite sexes. Indeed, the sexual anarchy that had existed in anthropoid herds and, apparently, among the australopithecines was incompatible with the behavioural requirements of production collective members. Consequently, the Homo habilis had to introduce some restrictions in sexual relations within a collective. This was also required by the process of rearing the young, which presupposed a big role being played by adult males.

Thus, with the origin of the production by the Homo habilis of objects, food, etc. there must also have appeared new family-clan relations in their associations, which more or less ensured the normal reproduction of generations capable of leading a primitive social life, i. e., capable of working permanently or temporarily, of coordinating their behaviour with the needs of the collective, of not committing serious violations of the new way of life.

On the whole it may be assumed that the gradually strengthening economic and family-clan relations of the Homo habilis formed a rather complex structure of emerging social associations of incipient human beings, which was bound increasingly to dominate the individual behaviour of its members, to direct it towards overcoming individualism and egoism, suppressing outbursts of fury, etc., and to promote the enhancement and development of its social character.

It is quite obvious that the emergence of a new, social life, permanent production of the necessary material boons and reproduction of

new generations of its participants presupposed the appearance of new, social forms of communication, which we will dwell on further.

B. The Further Development of Consciousness

How was the further development of the Homo habilis' incipient social life manifested and what was its result? What was the significance of this development for the origin of language and consciousness? We will attempt to reply briefly to these extremely complex questions, on which there is no consensus among scholars. We base our analysis of present-day factual material on the ideas developed by Frederick Engels and other Marxist authors.

As shown above, the leading, determining role in the appearance of a rudimentary primitive Homo habilis community was played by the origination of the systematic manufacture of a whole range of diversified instruments of labour. One can logically presume that precisely the progress of such manufacturing was the primary cause of the further development of incipient Homo habilis communities. And this assumption is fully confirmed by facts.

Numerous studies of primitive technology have shown, first, the steady improvement of the manufacture of instruments of labour by the Pithecanthropi, Sinanthropi and Neanderthals and, second, the similarity of its laws and results in all regions of the planet where this process took place. S. A. Semyonov clearly elucidated the general development laws of primitive technology in the epoch of the primitive

The pithecanthropi

herd.[1] Included among them should be the utilisation of ever new types of stone, bone and wood by the incipient human beings. In the epoch of the Mousterian culture, many kinds of rock were already being used and quarried, and workshops were being set up for the pre-processing of raw material. Also observable is a pattern of a more efficient use of this raw material. One can readily see that these development patterns of primitive technology were linked with the gradual perfection of consciousness as the incipient human beings learned more and more about the important properties of stone and other raw materials and their expedient use. All this, along with the need to store such knowledge, to pass it on to one another and to new generations, necessitated the appearance and perfection of new, human means of communication and thinking, without which it would have been impossible to select from among a multitude of objects the one from which the necessary instruments of labour could be made.

An important development pattern of primitive technology was the complexification of auxiliary tools such as anvils and hammerstones, and the making of billets for future instruments. It has been discovered that the Sinanthropi already had special shops, in which quartzite brought over long distances was subjected to pre-processing for subsequent use in the manufacture of definite instruments of labour. Even more sophisticated shops of this kind were

[1] See: S. A. Semyonov, *Primitive Technology*, Moscow and Leningrad, 1957, and S. A. Semyonov, *The Development of Technology in the Stone Age*, Moscow, 1968 (in Russian).

found in places of early and late Mousterian occupancy. It will be readily seen that this development pattern of primitive technology attests to the perfected psyche and means of communication of incipient human beings. Indeed, the carrying out of such complex actions that were not directly connected with each other presupposed the origin and development of comprehension of the correlation between the general and specific goals of the incipient man's actions, and hence, the emergence and development of logical thinking and, correspondingly, language means of communication.

This is borne out by other development patterns of primitive technology: differentiation of instruments of labour into standardised tools for different purposes, their growing efficacy by sharpening the tool's working part, increased weight of some of them, etc. Thus, in Mousterian culture there existed diverse hunting tools, including lances and boarspears, tools for digging up plants and root crops, whole sets of tools made out of splinters for chopping up meat, etc.

A significant basis for the development of consciousness and means of communication of incipient human beings was their mastery of such a threatening yet useful and essential for their survival element as fire. Already the Sinanthropi, who lived some 400,000 years ago, kept a fire going permanently in the caves where they lived (the layers of ash and coal preserved in them reach a height of several metres). With the aid of fire they processed meat food, which was easier to digest. Undoubtedly, life beside a hearth with a fire promoted the consolidation

of incipient human beings into an integral group and facilitated the social upbringing of offspring. Facts convincingly show that the Neanderthals had advanced noticeably compared to the Sinanthropi in the mastery and use of fire (this will be dealt with further).

Even such a brief review of facts concerning the manufacture of instruments of labour in the primitive herds of Pithecanthropi, Sinanthropi and Neanderthals makes it possible to reply to the questions posed above. First, the main factor in the appearance of social associations, the manufacture of instruments of labour, developed slowly but steadily, and, second, precisely its development was an important cause of the progress of the Homo habilis' emerging consciousness and the new, human means of communication linked with it.

But, as we have seen, the manufacture of tools was carried out for their further expedient, i. e., conscious use in hunting, foraging for vegetation and other types of labour activity. Numerous facts show that the daily life of incipient human beings became ever more complex and multiform in character; it required the organisation and consciousness of all members of their association. Indeed, the Neanderthals already hunted elephants and other large animals with the aid of pits, the preparation of which was impossible without cooperative labour and special digging tools made out of wood, horn and bone. Existing data show that the Neanderthals, who lived in a cold climate, constantly engaged in making clothing out of the skins of killed animals: found at their places of occupancy have been scrapers for treating skins, various

Neanderthal campsite

bone awls, pins, etc. The Mousterians were characterised not only by a cave mode of life; they usually built permanent dwellings in the form of cone-shaped constructions consisting of poles covered with skins, which is borne out by their foundations, made out of stones and the bones of big animals, and also by the household utensils of the inhabitants of these structures found inside them.

Many facts testify to a substantial development of the Neanderthals' community life. We cite only the most striking ones showing how these ancestors of man cared for each other. Found at the Shanidar (Iraq) campsite, belonging to the Mousterian culture, was the skeleton of a forty-year-old man (for the Neanderthals this was ripe old age) with a badly damaged head and left eye, and an amputated right hand. In short, during his life the man was completely crippled, useless for the community, yet he had lived for quite a long time since, apparently, he had been taken care of for many years.

Under the influence of progress in making different types of instruments of labour the life of incipient men grew ever more complex, close to real human life. With the late Mousterians it differed little from the life of the first real people with their complex technology, diversified human relations within the primitive communities. It is quite obvious that on approaching the latter the members of the Mousterian associations became ever more conscientious, fully comprehending the common needs in assigning each of them work needed by the entire community, that they correctly and skilfully used the instruments of labour, ever more often

subordinating their own desires and goals to the common goals, etc.

As we have seen, language and consciousness of the first human beings appeared not merely as a result of the development of separate individuals and their psyche, but as an important aspect of the transformation of australopithecine herds into production associations — first of the Homo habilis, then the incipient human beings with a complex system of social relations and common social requirements within the associations. We note simultaneously the fundamental similarity of the genesis of consciousness in the first human beings with the above-cited experiments in the development of the psyche of anthropoids. In both cases a definite role in this respect was played by the australopithecines' and apes' mastery of specially made objects (with the australopithecines it was instruments of labour, with the apes — household utensils, tools, etc.) and the inclusion of both in social collectives, and by their learning the simplest forms of human, language forms of communication. The above-noted similarity once again convincingly proves the correctness of Frederick Engels' ideas on the decisive, determining role of social labour in the origin of human consciousness, its social nature.

Before going on to a direct analysis of the genesis of language and consciousness, it is essential to stress the tremendous difficulties linked with the appearance of society as a whole, as a result of which this process continued over for two or three million years. First, they were caused by the slow but steady spread of the incipient human beings across the planet —

in the vast regions of Asia, the Near East, Europe and, hence, by the need to adapt to life in new natural conditions. Second, the development of collectives of incipient human beings was hampered by the periodic onset of falls in temperature, especially in Europe and Asia, demanding additional effort to ensure normal life. Finally, a serious obstacle for the progress of consciousness and language, and hence all social life, was the lag in the development of the bodily structure of the incipient human beings. This was particularly pronounced with the Homo habilis, the structure of whose brain and organs of speech approximated that of the ape, i. e., with the main bodily basis of consciousness and language. To a lesser degree, but also very noticeable is the deterring influence of the slow (in comparison to the development of production) perfection of the brain and organs of speech of man's ancestors throughout the entire transitional period — from the australopithecines to primitive man.[1]

However, our distant ancestors, despite all the difficulties, slowly but steadily advanced along the road of transformation into real human beings possessing consciousness.

§ 2. The Emergence of Consciousness

The great complexity of the phenomenon of consciousness does not permit scholars fully to elucidate its nature, which hampers the understanding of the genesis of conscious-

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[1] See: V. I. Kochetkova, *Paleoneurology*, Moscow, 1973.

ness. We cite only a few controversial issues concerning this problem. Does human consciousness differ from the psyche of higher animals and if so, how much and in what way? What are the main causes of its appearance? In what forms did it appear? When and in whom did it emerge? Without analysing in detail the different approaches to the solution of these and other problems concerning the genesis of consciousness, we note, in general outline, the ways of solving this problem. Imagine someone from another planet coming to us on earth, and ourselves in his place for a minute. By what indications could he assume with a certainty that the beings he sees on earth are rational creatures? First of all, evidently, by the diverse technology that people have created and which distinguishes them from all the other animals, and above all by the special means of locomotion created by them, which are practically non-existent with animals. In addition, he, obviously, would notice the artificial means of communication created by people, the collective labour with the aid of technology, etc. It should be noted that many indications of the rational life of contemporary people were also inherent in the Homo habilis. We saw that they also made and used to advantage diverse instruments of labour, lived together in one place, continuously organised the process of production and group life, etc. True, the Homo habilis still lacked artificial means of locomotion and communication, but even without them it is obvious that they had to possess the rudiments of consciousness and language.

Since human consciousness does not exist idependently, but as an aspect of man's behavioural acts, its genesis must also be considered in the light of the appearance of social production and labour. It should be borne in mind that, as a consequence of the protracted process of the appearance and development of production, consciousness also, evidently, was formed gradually: it appeared in an embryonic form, which under the influence of the development of production was transformed into genuine consciousness of primitive man. That is why we will first examine the appearance of the rudiments of consciousness, and then the process of their further development under the influence of complexification of the incipient human beings' relations with nature and with each other.

A. The Origin of Consciousness

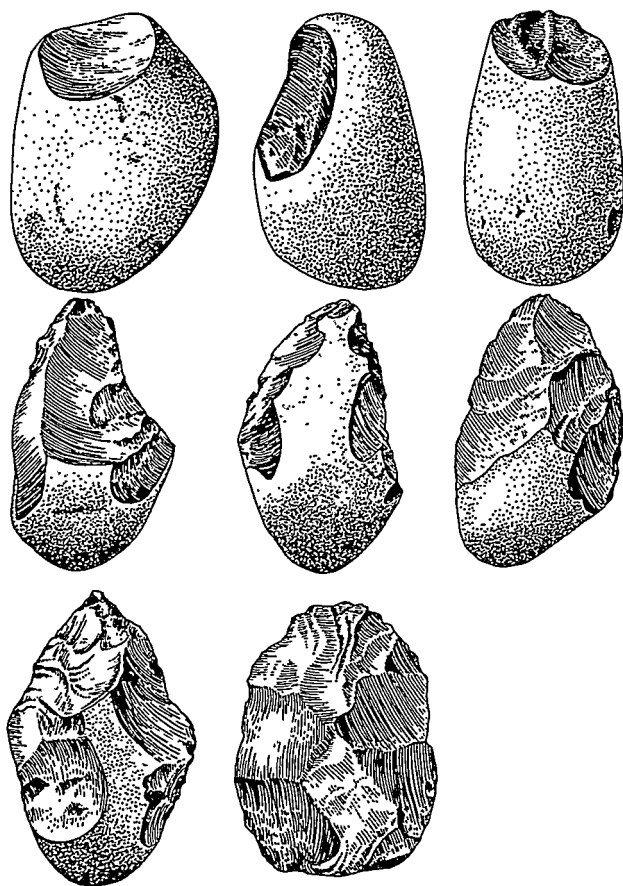
We saw that the primary cause of the appearance of human beings with their language and consciousness was the origin and development of the production of diverse instruments of labour, which transformed the relations of incipient human beings into new, social relations, both with respect to nature and to each other. How did the production of instruments of labour and their expedient use in hunting, defence and other types of labour activity influence the psyche of the Homo habilis?

First of all there occurred an appreciable complexification of different types of activity by the Homo habilis in comparison with corresponding types of anthropoid activity, even in experimental conditions. We saw that anthropoids

are capable of varied complex actions, which they can carry out in new social conditions if compelled to do so by the experimentors' demands. Outside the experiments their behaviour remains unchanged. As for our distant ancestors, the Homo habilis, their activity in making tools and expediently using them gradually became a behavioural norm with them, and with its growing complexity required a new psyche. For even the making of a hand chopper required of an individual the drawing up of a complex plan of action, a chain of concrete closely interrelated goals, and hence, also great mental effort, concentration of attention, will, a knowledge of the essential properties of stone and other materials, and development of corresponding skills. In ordinary conditions chimpanzees and gorillas perform very simple operations in procuring food, which influence the nature of their psyche. The results of this include impulsive, unbalanced behaviour, poorly developed skill in the use of objects, etc., and the immediate discontinuation of activity as soon as the apes' needs were satisfied. In principle the psyche of the chimpanzees and gorillas remains the same in experimental conditions.

But the chief distinction between the embryonic psyche of the Homo habilis and the psyche of the australopithecines must necessarily have consisted in the fact that, with its aid the Homo habilis reflected the social requirements of daily labour, and were aware to a certain extent of the social meaning of their actions, which were no longer primarily subordinated to the satisfaction of their own biological needs but, as noted earlier, to the common needs in corresponding instruments of

labour and the results of their use. Something of the kind is discernible also in herds of animals which, say, ensure the herd's security and perform other duties associated with their vital activity. However, first, the herd animals' performance of these duties coincides with the satisfaction of their own biological needs in security, etc., whereas the Homo habilis were compelled to make instruments of labour. Second, the knowledge and behavioural experience of animals remained practically unchanged, while the psyche of incipient human beings changed, however slowly, as a result and on the basis of the development of social production.

Science indicates yet another important cause of the transformation of the australopithecines' psyche into consciousness. This is the growing influence exerted on it by primitive technology, continually perfected from generation to generation, which in the form of optimal, more or less definite shapes of instruments reflected the accumulated knowledge of the properties of objects, skill in processing them, etc. Thus the instruments of labour acquired for the Homo habilis a meaning differing from ordinary objects, were distinguished from them by being social, i. e., belonging to the given community. It is true that some species of animals build structures that are specifically "their own", for example, the beavers' lodges, dams, canals. But such constructions provide purely biological, practically unchanging information about the typical needs of the given species: burrows and lodges are built from generation to generation to ensure a secure existence of the adult individuals and their offspring, the dams — to maintain the necessary level of wa-

Production of chopping tools by the Homo habilis

ter in the reservoir, etc. This information is passed on automatically to each new generation of this species and is stored in the latter's organs of heredity, not in the structures built by them. And only with people there appears a special, constantly developing carrier of social information, above all in the form of means of production, which is passed on in quite a different way. Insofar as each object made by labour is social in nature, the social properties and functions of tools cannot be automatically inherited through biological channels. Hence their social function in groups of men — passing on of the knowledge about instruments of labour and skills to ever new generations through special training. Already the Homo habilis were bound to carry out this function.

In what way was the new in the psyche of the Homo habilis expressed as a result of the transition to systematic production of instruments of labour and other primitive equipment? Evidently, there may have appeared elementary empiric notions, which reflected the common properties of different kinds of rock, wood, bone, for example, a flint's tendency to split in definite directions, producing splinters with sharp cutting edges, or the typical external appearance of flint, according to which an individual was able to select it from among a multitude of stones. Similarly, in processing objects the Homo habilis and later types of incipient men evolved many other, as yet poor in content, notions about the important properties and associations of these objects.

Evidently before performing such complex operations in making diverse instruments of labour, the Homo habilis had to begin with thinking

over a plan of future actions, selecting raw materials and auxiliary means. In short, they first had to perform special acts of thought, the essence of which consisted in the substitution of implemental actions by sign actions such as gestures and sounds. With their aid an individual, on the basis of past behavioural experience stored in his memory, reproduced corresponding notions about the properties and associations of objects. In performing the necessary gestures or uttering definite sounds, he operated with notions, transforming them into goals of future actions. Thus, the simultaneous appearance of labour and language together with the comparatively developed bodily structure of man's ancestors predetermined the appearance of the beginnings of completely new thinking — notional thinking, which existed prior to implemental acts of behaviour. As we recall, with all animals, including obviously also with the australopithecines, thinking was and remains a part of an implemental act of behaviour.

However, these features of the Homo habilis' psyche can hardly be considered the primary ones, distinguishing it fundamentally from the psyche of animals. As shown above, in experimental conditions apes displayed great persistence in complex implemental activity for the achievement of an end result, drew up plans for it, etc. The specifics of the emerging conscious psyche of the Homo habilis must have consisted in something else. As we will recall, the australopithecines procured food with the aid of natural tools practically individually (foraging for vegetation) or by uniting their individual efforts, like other animals, in hunting and defence. Their only concern was the satisfaction of purely biological

requirements. However, the Homo habilis were forced constantly to digress from their biological needs for the creation and development of primitive technology, thereby satisfying the common need in it. And in order to understand the new, social requirements that all members of their community had in common, the Homo habilis had to learn new, verbal acts of communication. In short, the emerging social system with its systematic production and expedient use of the instruments of labour, with new, far removed from the ordinary biological, requirements, demanded also a new psyche, consciousness.

What did these new features consist in? First, in the fact that the Homo habilis reflected, to a certain extent, the common concern for the production of various instruments of labour, which required digression from their own biological needs. This reflection must have been expressed in the appearance of an as yet vague understanding of one's personal duty to work for others, the need daily to change one's activity for the sake of common goals, deliberately to use instruments of labour in accordance with their purpose, yield the results of one's labour to the community, etc. Obviously, without such a psyche, however poorly developed it may have been, the incipient human communities could not have survived, to say nothing of developing in the direction of real human beings with their consciousness and language. Understandably, neither the australopithecines nor any other species could have had even the rudiments of conscious psyche, for they were guided solely by the herd's developed biological requirements.

Second, the Homo habilis in all likelihood had daily to *restrict* acts of behaviour that were harmful to the community's common concerns of producing the means for supporting its vital activity, rearing of the offspring, etc. This restriction necessarily found expression in the appearance of corresponding basic norms of behaviour for all community members, a ban on the more harmful actions (for instance, fighting over food or for possession of females, or violation of cooperative labour processes, etc.). The possibility of the appearance of rudimentary norms of behaviour, which were essentially social in character, and above all the emergence of bans on asocial acts of behaviour that were recognised by most members of a nascent collective, was predetermined, on the one hand, by the existence of similar biological norms of behaviour in herds of apes and, of course, with the australopithecines, armed with clubs, sharp bones, and stones. On the other, the existence of systems of strict ban-taboos in literally all primitive tribes permits us to assume that the Homo habilis also possessed them in an embryonic form, for without them normal social life would have been out of the question.

Third, already the first incipient men had to develop in themselves, apart from an awareness of the social goals and norms of behaviour, a "purposeful will", i. e., the ability to overcome any difficulties for the sake of achieving socially useful results, to regulate their actions in accordance with a charted plan, subordinate their needs to common ones, and to abide by the behavioural norms established by the collective.

Finally, note should be made of such an impor-

tant feature of the incipient consciousness as the appearance of human emotions and feelings, for example, the feeling of solidarity, mutual assistance in all common affairs, the feeling of a common kindred origin and isolation from other groups of Homo habilis, etc. Understandably, the new emotions and feelings were conducive to the normal social life of the first collectives of man's ancestors, their further development towards humanity.

Could the process of the origination of consciousness, which is social in character, have begun precisely in groups of Homo habilis with their comparatively small brain, which differed structurally only slightly from the brain of the australopithecines? Scholars hold different views on the question. Some presume that in view of the above-cited causes, and despite their complex labour life, the Homo habilis did not possess consciousness and made do with conditioned reflexes. Others, on the contrary, hold that the level of development of the Homo habilis' bodily structure was insufficient for the appearance of the rudiments of consciousness.

In our view, the latter approach is the more valid one. First, not only the brain but also the working and sensory organs are important for the birth of a new psyche. And according to these indications, even the australopithecines and anthropoids differed very little from man. Second, one has to consider the great possibilities of the bodily structure of higher animals and, of course, the Homo habilis for the complexification of their behaviour. We recall that even the chimpanzees and gorillas with their far less developed brain than that of the Homo habilis, were able

to achieve notable successes in their behaviour and the development of their psyche in experimental conditions. This is especially true of the Homo habilis, whose brain was close to man's in many respects, as has been proven by a meticulous study of its skull.

Thus, on the basis of the material expounded in this chapter we can draw the conclusion that with the appearance of systematic production of instruments of labour, and with the formation of economic and family-clan relations and social requirements, there must have appeared the rudiments of the new means of communication and consciousness. The main distinction between the consciousness of the first incipient human beings and the psyche of the australopithecines and all animals consisted in its *social* nature, which was initially manifested in the knowledge stored from generation to generation about important phenomena of nature and society, and also about the norms of social and labour behaviour, will and feelings evolved by them. Obviously, further progress of the consciousness of incipient human beings was also based on the development of their social labour and social relations. Let us examine this complex process in the light of the latest scientific data.

B. Conclusion of the Process of the Genesis of Consciousness

The above analysis of the development and perfection of the production of instruments of labour and its result — primitive technology, makes it possible for us to reveal the basic fea-

tures of the development of consciousness in incipient human beings in, as it were, its "technological" aspect.

The discovery by archeologists of the gradual complexification of implements and technology, especially in the case of the Neanderthals, makes it possible quite accurately to judge of the corresponding development of their consciousness. Take, for example, the Neanderthals' making of the spear. It presupposed a knowledge of the properties of several materials — stone, wood, and the substances used for joining them. The making of this composite weapon presupposed uniting in one whole a comparatively large number of acts of behaviour — the search for and storing of the necessary kinds of wood and stone, their preliminary and final separate processing, joining, completion, testing. The role of the uniting factor must have been played by the ideal mental notions of the future weapon as the final goal of the entire work, to which all intermediary operations were necessarily subordinated in strict succession. The designation of such notions, goals and concepts of the properties of the materials clearly required special gesture and sound signs. With their aid individuals carried out the process of thinking, which preceded actions with their working organs. The substantial difficulty of making this weapon presupposed the presence in the primitive artisan, apart from knowledge and skill, also a clearly expressed will; otherwise it would have been impossible to make the spear. Presumably, this complex work was accompanied by corresponding emotions, expressing distress in the case of failure and joy in achieving the charted goal.

The Neanderthals learn to tame fire

An appreciable role in the development of the Neanderthals' consciousness must have been played by their further mastery of fire. Facts show that the Neanderthals not only utilised flames resulting from fires and other natural causes, as did the Sinanthropi, but procured fire themselves, making possible its fuller and more varied use for their own goals. It has been established that the Neanderthals used fire for making diverse instruments of labour. Thus at a campsite in Loringen (Lower Saxony) a 244-cm long spear with a sharp heat-tempered end made out of a yew-tree was discovered between the ribs of a preserved elephant skeleton. Found at a Mousterian period campsite near the Kalambo Falls (Zambia) were diverse wooden tools (sticks for digging up plants, clubs), made with the aid of fire. The Neanderthals used it also to soften bones for their subsequent processing, for heating stones, etc. Indubitable also is the growing role of fire in the further consolidation of the Neanderthal associations, which already lived in artificial dwellings and engaged in a wide variety of pursuits.

The mastery of fire substantially enriched the knowledge of incipient human beings, particularly the Neanderthals, promoted the development of their skill in handling ever new kinds of materials, in foreseeing the results of treatment by fire in various situations and labour processes, etc.

The development of technology and the use of fire served as the cause of perfecting all other types of activity of the incipient human beings,

The Neanderthals hunfing the cave bear

and along with them their language and consciousness. Since the most pronounced results of this process were discovered at Neanderthal campsites, we will cite a number of facts from their life confirming it.

The Neanderthals' hunting for big animals — mammoth, elephant, bear — attained a wide scale and notable complexity. This is borne out by large accumulations of bones at their campsites in Asia, Europe, the Caucasus and elsewhere. Understandably, hunting for such big and dangerous animals required the participation of all able-bodied members of the group (protocommunity) and its good organisation. Indeed, it was impossible to overcome a mammoth or cave bear, which was twice the size of the present-day brown bear, singlehanded, with the aid of a primitive weapon. The Neanderthals hunted big herbivores by driving them into swamps or down steep cliffs, after which they killed the helpless, maimed beasts with stones and clubs. In hunting for bears they usually used boar-spears and clubs, and also heavy stones, which the Neanderthals flung down at the animals from above (this is borne out by the crushed upper parts of a multitude of bear skulls found in paleolithic caves in the Alps, the Caucasus and elsewhere).

But the large carcasses of slaughtered animals had to be conveyed to the campsite. As shown by numerous facts, the Neanderthals immediately performed diverse labour acts at the hunting ground — ripped off the skin and cut up the carcasses of the slaughtered animals, and then carried away all the useful parts to their permanent or temporary hunting campsites. There

the prey was processed in different ways and fully utilised. The scratches, incisions and cuttings discovered in the bones of animals at Neanderthal sites reveal to scholars the picture of the complex process of their utilisation. It has been clearly established that the animals were skinned, and that the skins were later processed for making clothing. This was an essential measure, since the hunters lived in cold parts of the earth — Siberia, Northern Europe, etc. Thus at the excavations at Grotto de l'Hortus in France it was found that its inhabitants had hunted for procuring the fur of certain animals: only their skins were brought to the campsite. Of course, the meat of the prey was fully utilised (either raw or fried), while the bones and skulls were shattered in order to take out the marrow and brain. The sinew, bones and other parts of the carcass were used in housekeeping.

The Neanderthals not only hunted big game for meat, but also fished. For instance, Soviet researcher V. P. Lyubin discovered over 23,000 bones of salmon, including 4,400 spines, in the Kudaro cave in the Caucasus. Vegetation must have occupied a sizeable part of the Neanderthals' diet. Naturally, no remnants of it have been preserved; however, unquestionable signs of its processing and preparation have been discovered. Thus, found at campsites in Moldavia (USSR) were many scrapers and pestles for grinding and pounding vegetation, including the seeds of wild plants.

Apart from concern for feeding themselves and their offspring and making clothes the life of the Neanderthals in the cold parts of the planet was complicated by the need to build

different types of dwellings to ward off the cold and for household needs. Numerous remains of such dwellings have been discovered in practically all places of Neanderthal habitation, attesting to their leading primarily a sedentary way of life, accompanied by seasonal migrations, temporary hunting campsites. For a permanent domicile they used caves, often acquired by ousting bears. Found in La Baume-Bonne cave (France) was an oval $5 \times 2{,}5$ metre dwelling, the floor of which was covered with pebbles to keep off dampness. The Neanderthals increasingly inhabited the planes, on which they built permanent dwellings from bones of mammoths and elephants, and also from poles, which were covered by animal skins. Thus, discovered at the 190,000-year-old campsite near the Kalambo Falls were stones laid out in a half-circle, evidently serving as the foundation of a dwelling. Such foundations of permanent Neanderthal dwellings, with a floor-space of several dozen square metres, have been discovered elsewhere as well, as in some campsites on the territory of Moldavia, USSR. Usually found inside such dwellings are a lot of kitchen leavings, fireplaces, pits for storing food, various objects and tools. Also discovered were special shops in which the Neanderthals made their instruments of labour.

Such a complex mode of life of man's distant ancestors attests to the existence in their collectives of a complex system of production and other relations with the apportioning of work to the members in accordance with their physical characteristics, knowledge and skills, and with the uniting of the behavioural acts of hunters, gatherers of vegetation, artisans who made

instruments of labour, clothes, ect., into a single whole. Quite obviously the Neanderthals' common norms of behaviour, which were generally observed, were more developed than those of the Homo habilis. In all likelihood, however, infringements still occurred. This is borne out by cases of Neanderthals attacking one another and devouring the victims. For example, found in Krapina cave in Yugoslavia was a multitude of bones and especially broken skulls of Neanderthals, the brains of which were eaten by other members of the community. But on the whole such a complex community life of the Neanderthals was, undoubtedly, possible only given their cohesion and mutual assistance.

This conclusion is justified also for such an intimate side of their common life as the reproduction of new generations capable of systematically working for the common weal, voluntary abidance by norms of behaviour, possessing a minimum of knowledge and skill for useful labour.

Scholars are especially attracted by the question of the Neanderthals' ability to establish normal sexual relations in their communities. Some of them consider that the sexual instinct of the males was so strong that the primitive Neanderthal herds were constantly shaken by their fights for the possession of females. But the latest discoveries confirming the Neanderthals' complex mode of life have led the majority of specialists to the conclusion that relations were peaceful between the males. In addition, facts concerning the sexual relationships of modern higher apes, as we saw, clearly bear out the possibility of overcoming this instinct by peaceful

means even in the case of animals, to say nothing about a human environment.

Numerous studies of the life of primitive peoples have shown that notwithstanding the importance of normalisation of conjugal relations with the aid of various traditions and interdictions, it was not they that comprised the essence of reproduction, but relations between generations, adults and children, common concern for the upbringing of the younger generation. This is confirmed also by the existence among all primitive peoples of initiation rites, i. e., diverse and occasionally extremely harsh testing of youths and girls, linked with their transfer to adult groups, all manner of rules, customs on the concern of everyone for the children, etc.

Since the life of the Neanderthals was largely reminiscent of that of the primitive man, we may presume that in their associations there must have existed similar, though less developed systems of norms of rearing offspring (by their gradual involvement in cooperative work with adults, abiding by the general norms of behaviour, etc.), which ensured the continuity of generations in the social sphere.

Ultimately, the chief cause of the process of formation of Neanderthal collectives was obviously common production of the essential means of existence, on the basis of which there also appeared social *clan* relations between all members of the association. What is their nature and what role did they play in the life of emerging collectives? Studies of the primitive peoples' way of life have shown that such relations express the unity of origin of members of a primitive collective from a common ancestor. Blood kinship

was manifested in a collective's own language, its customs, traditions, etc., which governed the life of each member and separated the given collective from all other associations — clans, phratries, tribes. This unity struck the people's eye, they were well aware of it, whereas their economic, production-related unity remained in the shadow. Nevertheless, precisely the latter was the most important form of unity, which gave rise to clan relations, and with time predetermined the steep decline of their role in man's daily life.

So, by the end of the transitional period from the australopithecines to primitive people the development of production of instruments of labour, of all economic life, systems of economic and other relations in Neanderthal herds, which expressed their social essence, had reached quite a high level of maturity. By their complexity and diversity the labour and communicative acts of behaviour of the Neanderthals, which predetermined a corresponding progress of their language and consciousness, already differed but little from the behavioural acts of primitive men.

But was a social basis alone sufficient for the appearance of language and consciousness? It is common knowledge that the language and consciousness of each of us exist simply thanks to the normal functioning of a perfect brain, organs of speech, etc., that is, thanks to the normal activity of the human body. How did all these organs function in the case of the Neanderthals? Let us take the main one — their brain. A careful study of the moulds inside Neanderthal skulls has shown that at least with a part of them — the so-called progressive Neanderthals — it differed little from that of man in volume and structure.

It is much more difficult to find out whether the development of their organs of speech ensured the Neanderthals' ability to communicate with the aid of words. Recent studies of the throat and mouth cavity of apes, Neanderthals and man, conducted by a group of US scholars, have shown that in the process of evolution, the transformation from ape to man, these organs gradually acquired the capacity for very fine articulation, ensuring the possibility of articulate sound speech. Thus, an adult man's throat with its vocal chords that regulate the flow of air in vocalisation, is situated much lower in the mouth cavity than in the case of other primates, which improves resonance as an essential condition for the enunciation of vowels. On the other hand, such an organ of speech as the tongue is much more agile, higher and thicker in man, ensuring the possibility of pronouncing a great variety of sounds, changing their character.

How closely do the Neanderthals' organs of speech resemble those of man? In an attempt to answer this question, Philip Lieberman and his co-workers studied the well-preserved bone fossils of a classic Neanderthal, i. e., a Neanderthal that had largely reached an impasse, differing from the progressive one discovered near La Chapelle-aux-Saints, France, back in 1908. As a result of protracted and painstaking work scholars were able to recreate a mock-up of the mouth cavity of the Neanderthal. With the aid of a computer they studied the sounds a Neanderthal could produce with such a mouth. It was ascertained that though the space above the gullet was much less in a Neanderthal than in man, and his tongue was thinner, he nevertheless

was capable of pronouncing many sounds, including vowels, which signifies that the Neanderthals were in principle capable of communicating with the aid of articulate sound speech. This conclusion is upheld by a comparative analysis of the organs of speech of the Neanderthals, australopithecines and chimpanzees conducted by the above-mentioned scholars. It appears that there was practically no difference in this sense between the last two, which reaffirmed that the australopithecines belonged to the animal world, while the Neanderthals, especially the progressive variety, belonged on the whole to that of man.

In what forms did consciousness appear in incipient men, especially in the Neanderthals, the direct predecessors of real human beings? In order to reply to this question, we must first clarify the specifics of the consciousness of the latter, the forms that were most characteristic of people of primitive society. Only when knowing the result of the genesis of a phenomenon, can one understand its nature and forms.

At this writing there is no single opinion regarding the understanding of the essence of the psyche of primitive people. Yet for all the diversity of opinion on the matter, we can single out on the whole the generally accepted distinctive features of the consciousness of the people of a clan society.

Most scholars unanimously stress the fundamental difference between the thinking of primitive men and that of all higher animals and, contrarily, its resemblance to that of man. Like human beings today, primitive men also possessed a store of notions and corresponding words essential for life, thought according to the same

laws of logic. Not by chance did people from tribes who were at a primitive stage of development readily understand the scholars who studied their way of life, and the children of the former, studying in schools in civilised countries, often surpassed their coevals in these countries in mastering sciences. An interesting research of primitive and contemporary thinking was conducted by the prominent French scholar C. Levi-Strauss, who established the unity of primitive and modern thinking. The data collected by him are very important in proving the total groundlessness of the attempts by present-day racists to belittle the psychic development of peoples freed from colonial dependence and oppression, and thereby to "uphold" the necessity of supervision over them.

The unity of thinking of primitive and contemporary men has a tremendous significance in revealing the essence of the genesis of society. You have seen that the Homo habilis already possessed the beginnings of a notional, genuinely human thinking and in this sense represent a dawning beginning of human society, a legitimate stage of its appearance. The results of the study of primitive consciousness are applicable to an even greater extent to the Neanderthals.

A second important feature of the consciousness of primitive men is its *collectivist* character, which finds expression in common interests and goals, in mutual assistance and aid in their difficult daily life. Associated with it are such character traits of primitive men as honesty, courage, fortitude, etc., which are recognised by practically all researchers. However, it should be added that this applies only to their behaviour

within their own collective, but not to members of other tribes. Evidently, the consciousness of the Neanderthals should also be seen as collectivist.

The common workaday life of primitive men was conditioned by the presence of a sizeable store of knowledge about the useful and harmful properties of many environmental phenomena, objects, basic laws of the procreation of animals and plants, change of seasons, atmospheric conditions, etc., and by their skilful utilisation in everyday life. In this connection, scholars hold, there appeared an aspect of the consciousness of primitive men, such as confidence in the existence of a universal causality, subordinating all people and all environmental phenomena. This was an extremely important achievement in the thinking of primitive man, helping him to work successfully, avoid dangers, and achieve the fulfilment of his diverse goals. Hence the inevitable conclusion on the genuineness of the knowledge of primitive men, their consciousness as a whole.

At the same time science has established the existence of properties of the consciousness of primitive men inherent only to them, for they were engendered by the weakness of their production and the undeveloped state of their life as a whole.

Since primitive men lived in small closed collectives, their consciousness also bore a narrow, local character, and consequently, was distinguished by a relatively poor store of knowledge and exceedingly slow development. Small wonder then that primitive society existed for about 40,000 years.

The weak development of primitive consciousness is especially clearly seen in the fact that it was not separated from practical life of its bearers. And though in their acts of labour and communication primitive men first thought, and then acted, their acts of thinking did not yet form an independent sphere of life, being closely linked with the behavioural acts themselves. Even their activity in creating different forms of art was subordinated to practical goals, being a component of social labour. Some examples of this are sculptures of bears, which served primitive men as targets for throwing spears, the dances of primitive people, in which they imitated the methods of future hunting, etc.

Primitive men's constant subordination to the threatening forces of nature, complete dependence of their life on the presence of animals and plants, and frequent fruitlessness of their common labours engendered in them a striving to somehow overcome their helplessness. Precisely these circumstances explain the appearance in all primitive peoples of notions of the possibility of achieving success with the aid of magic ritual actions, which supposedly helped to draw on their side the mysterious forces of nature, spirits of the dead, etc. Science has proved that primitive man's thinking was dichotomous. On the one hand, he had a good notion of the actual forces and phenomena of nature and society, adopted rational solutions and achieved the desired goals. On the other, he harboured illusory notions of evil and good spirits, was convinced of the efficacy of his magical actions in placating the spirits, causing damage to enemies,

presumed that any phenomenon could turn into its opposite, etc.

We note, finally, such a characteristic feature of the primitive man's *social* consciousness as totemism, which, as borne out by ethnography, is the oldest form of an awareness of their commonalty by members of tribal communities. Most important here is the belief in the origin of all its members from some animal, less frequently — of a plant and, consequently, belief in their blood kinship among themselves and with the progenitor (totem).

On the whole the consciousness of primitive men represented an undivided (syncretic) unity of all its main forms (rational knowledge, morals, art) with fantastic, religious notions of the forces of the external world and ways of influencing it. The enumerated features of the consciousness of primitive men distinguished it fundamentally from the psyche of higher animals, which, of course, can have no idea of supernatural forces, a common ancestor, etc. And most importantly, primitive consciousness embodied the accumulated knowledge of many generations about the essential properties of the phenomena around them, the causal associations between them, the methods and skills of making various instruments of labour and their expedient, effective use, awareness of the need to abide by accepted norms of behaviour, etc.

Let us take a look at the new data on the Neanderthals' common life in the light of the scientific understanding of the nature of consciousness in primitive society. On this basis, we shall attempt to reveal the character of the Neanderthals' thinking.

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The Neanderthals' thinking, in principle, must have been the same as in the case of primitive men though, naturally, it was less developed or complete. Indeed, the constant making of various instruments of labour, different types of complex cooperative economic activity necessarily enriched the Neanderthals' knowledge of the properties of the objects they processed or simply used, the causal connections between labour acts and their results, between diverse natural phenomena. The members of Neanderthals associations must have largely been aware of the norms of behaviour in labour and everyday life evolved by preceding generations. Without all this their cooperative activity in procuring food, making clothes, putting up dwellings, rearing offspring, defending themselves against beasts of prey would have been out of the question. As in the case of real people, there must obviously have appeared an embryonic sense of calculation among the Neanderthals. In order to make instruments of labour or support a fire, it was necessary to count the amount of required firewood and compare the latter with the time of its burning. The appearance of the beginnings of calculation was also required by acts of dismembering a whole into parts, for example, in cutting up the carcasses of slaughtered animals, and, contrarily, making up a whole out of composite parts in instruments of labour, dwellings, etc.

An important gain for the Neanderthals was the learning of rudimentary forms of art. The process of making complex, symmetrical tools was bound to engender in the artisan's consciousness not only a notion of their utility, but also

of their beauty, to arouse in him an aesthetic pleasure in his skilful actions and their results. Apparently, this aspect of the Neanderthals' work played a positive role in their life. It was labour that gave rise to the beginnings of art and that was the chief cause of their further development.

Numerous facts show that already in the Neanderthal associations there originated non-labour, non-utilitarian depictive activity, expressed in the form of making regular incisions and scratches on the bones of killed animals, in hollowing out blocks of stone in a definite order and dotting and colouring them in a regular pattern. The oldest monument to this kind of art is the fragment of a bull rib, discovered at an early Neanderthal site in Peche-de-l'Aze in the south of France. Discernible on it are deep parallel cuts made in a definite order. In the opinion of specialists, such activity of the inhabitants of the site no longer pursued utilitarian, but aesthetic goals; it is also possible that imprinted in these signs was some information, drawn up by the site dwellers. Such graphic symbolism was more reliable and lasting than the quickly disappearing gesture and sound signs and hence played a big role in the further development of social consciousness. A similar role was evidently played by the indentations and spots of ochra made on stone slabs in a definite order. The latter, in the opinion of scholars, was the symbol of life, continuation of the family.

As a consequence of their usefulness for the Neanderthals' everyday life, the embryonic forms of art were gradually developed. This is borne out by objects of primitive art with complexi-

fied forms of graphic elements (straight lines, zigzags, crosses), combinations of graphic and other forms of depiction, etc., discovered at late Neanderthal campsites. Thus, at a recently discovered (1976) Neanderthal site in Moldavia (USSR), found on the shoulder blade of a mammoth was a depiction consisting of lines, colour spots and indentations.

Thus, the consciousness of the Neanderthals, especially the late ones, represents the result of the protracted development of production and social labour. It played an important role in the appearance of human consciousness. This is borne out by the great volume of positive knowledge, accumulated by many generations of incipient men and consolidated in the skills of making and using instruments of labour, in the form and properties of the latter, in upbringing, in language and in the first works of art. The social and fundamentally rational character of the consciousness of the Neanderthals found expression also in their evolving certain norms of behaviour both within and outside a collective.

At the same time it should be stressed that the weakness of production, social relations, and emergent tribal ties in the Neanderthal associations predetermined the presence in their consciousness of features similar to those inherent in the consciousness of primitive men. Let us examine these features of Neanderthals' consciousness in greater detail, relying once again on contemporary scientific data.

An important feature of Neanderthal consciousness was the emerging religious notions, including also the totemic ones. Ethnographers

have proven the existence in many hunter tribes of a bear totem and corresponding rites for placating it, making of sacrifices, concern for it, burying parts of a killed bear, etc. It appears that the Neanderthals also performed such rituals, and on a very large scale. Discovered in the Drachenloch cave (Switzerland), which is located in the hills and served as a temporary dwelling for hunters, were bear bones, primarily skulls, placed in a definite order, in specially built cells. Found in one cell were six square boxes made of blocks of limestone and covered with a block of stone. The boxes were also filled with skulls and long bones of bears. And, finally, in a corner of the cave there was a bear skull encircled by small stones.

Quite a few such cult burials of bears have been discovered to date. Discovered in a niche of the Petershöhle cave (FRG) were selected bear bones arranged in a definite pattern and deliberately covered with stones. Nearby were other groups of bear bones, also carefully arranged in a definite order. Found in the Salzofen cave (Austria) in a special niche were five bear skulls. Each of them had been placed on a block of stone, surrounded on all sides by stones and covered by wood coals. Discovered in different parts of the Regourdou cave (France) in pits covered with stone blocks was a large quantity of bear bones and skulls. Examples of such finds, confirming the presence of rudimentary totemic notions in the Neanderthals, could be continued.

An extremely important characteristic of Neanderthal consciousness is their numerous burials. Undoubtedly, they show the concern of the

collective members for each other, as evidenced by their special burial with tools, food and other articles they were entitled to during their life. And found in the Shanidar cave was even a bunch of flowers, many of which turned out to be medicinal.

The unearthed burials permit us to speak not only of concern of the living for the dead, but also of the existence at the time of special ritual burials. This can be judged by the typical poses in which the dead were placed and by the specially dug pits in the caves where they were buried according to various rituals, in particular, that of orientation of the dead from the west to the east.

What is the most important aspect of Neanderthal consciousness? Was it primarily religious, as some scholars in the West maintain? Or was it so weak that the Neanderthals' behaviour was subordinated to the influence of instincts, instead of conscious goals? We presume that the above-cited scientific data on the Neanderthals' extremely complex, diversified cooperative activity in producing the essential means of existence and rearing their offspring prove the contrary. In spite of the presence of embryonic religious notions, the Neanderthals' consciousness was rational in content, i. e., included useful, practical knowledge of the important properties and associations of environmental phenomena, some understanding of general requirements, the need for mutual assistance in their complex everyday life and adherence to commonly evolved norms of behaviour. In

Ritual burial of the Neanderthals

short, the level of development of the Neanderthals' social life, and hence, also their language, constituted an adequate prerequisite for the appearance of the consciousness of primitive human beings, who were distinguished by a large store of positive knowledge, developed logical thinking and morals, etc.

* * *

Our interesting journey into the distant past of mankind, which was designed to elucidate, in the light of contemporary science, the riddle of the origin of human consciousness, and hence, also its nature, has come to an end.

We saw that consciousness appeared in a natural way under the influence of fully material, earthly factors, and not as a result of some supernatural causes. This conclusion is supported by the numerous experiments on apes, which we referred to in the process of our discourse. It was precisely the inclusion of apes in society that predetermined the development of their psyche towards that of man. To an even greater degree this conclusion is confirmed by an analysis of scientific data regarding the origin of society, an important aspect of which was the genesis of consciousness. It was the emergence and development of social labour, and together with it of social relations and language, that was the primary cause of the gradual emergence of consciousness.

The essence of consciousness itself consists not merely in the development and enrichment of the knowledge of incipient and primitive men about the properties of instruments and objects

of labour, nor in the acquisition of more and more experience of labour activity. (We saw that in experimental conditions chimpanzees and gorillas came quite close to man in this respect. Small wonder that many specialists ascribe consciousness to them!) The nature of consciousness lies in something else — above all in understanding by men (partly also by incipient human beings) of their common needs, common tasks, goals and means of their realisation, as well as activity for the common weal, requiring of them exertion of volitional and physical effort. In short, as distinct from the essentially biological herd psyche of all animals, human consciousness is initially *social*.

The progress of mankind quite obviously confirms the correctness of such an interpretation of consciousness, which sounds especially meaningful today. In our time, when all peoples, and consequently each person, advance to the fore such fundamental, universal tasks as struggle for the preservation of peace on earth, against the exploitation of man by man, for overcoming the economic backwardness of countries that have taken the road of independent development, environmental protection, etc., a truly conscious person is he who clearly grasps these acute global problems. And not only is such a person aware of the importance of solving such problems, but he also actively promotes this process.

Understandably, the task of illuminating the genesis of consciousness in the light of contemporary scientific data is infinite in both scale and complexity. That is why the author, limited by the size of this book, deliberately reduced the whole subject to an analysis of merely the social

origin of consciousness, leaving untouched such important issues as the association of consciousness with the brain, language, the nature of its ideal character, etc.

The author hopes that the scientific understanding of the origin and essence of consciousness expounded in the book will be useful both in answering the questions mentioned, as well as in solving other problems that are of interest to the reader.

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The book is devoted to one of the most complex phenomena on Earth — human consciousness. The author expounds in a popular form contemporary data on the origin of consciousness as the highest form of reflecting reality. He analyses the role of labour in the formation of thinking, the latter's association with the biological prerequisites and the process of the origin of society. Revealed in the work is the specific quality of consciousness, its association with man's speech, brain and social behaviour.

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